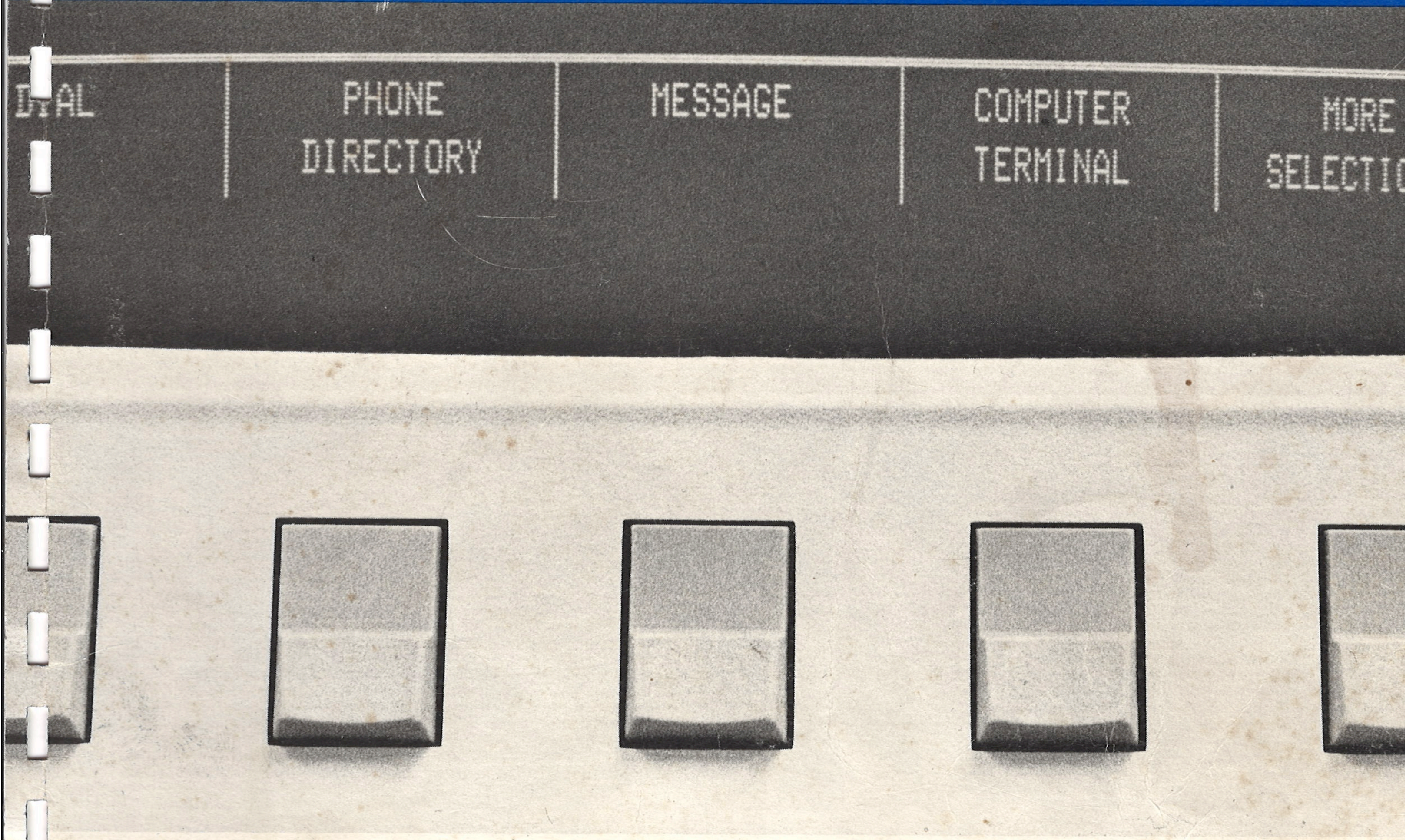
Operating Guide


DIAL
PHONE DIRECTORY
MESSAGE
COMPUTER TERMINAL
MORE SELECTIO

Multifunction Workstation

This device has been granted a registration number by the Federal Communications Commission, under Part 68 Rules and Regulations for direct connection to the telephone lines. In order to comply with these FCC Rules, the following instructions must be carefully read and applicable portions followed completely:

1. Direct connection to the telephone lines may be made only through a standard plug-ended cord to the utility-installed jack. This jack must be a USOC RJ11C. Certain non-standard jacks and plugs are in use in various telephone company service areas. To permit rapid connection of registered telephone equipment, certain approved adapters may be used between the pre-existing jacks and registered telephone equipment. If your service has a 4 pin jack, you may use adapter RJA1X; if your service has a rectangular 6 pin jack, you may use adapter RJA4X. You should contact your telephone company to confirm the proper adapter to use. Existing direct wired telephone lines must have a utility installed RJ11C.
2. No connection may be made to party or coin phone lines. Prior to connecting the device to the telephone lines, you must:
3. **Call your telephone company and inform them you have an FCC registered device you desire to connect to their telephone lines. Give them the telephone number(s) of the lines this product will be used on. Also give them the following information which is found on the base plate of this device, the make and model of this device, the FCC registration number and the ringer equivalence.**
4. After the telephone company has been advised of the above you may connect your device if the jack is available, or after the telephone company has made the installation.
5. Repairs to the device may be made only by the manufacturer or his authorized agent. This applies at any time during and after warranty. If such unauthorized repair is performed, registration, connection to the telephone lines and remainder of warranty period all become null and void.
6. If, through abnormal circumstances, there is a problem with the telephone line, your device should be unplugged until the source of the problem is determined. If your device is the source, it should not be reconnected until necessary repairs are affected.
7. Should the telephone company notify you that your device is causing the problem, the device should be unplugged. The telephone company will, when practical, notify you that temporary discontinuance of service may be required. However, where prior notice is not applicable, the telephone company may temporarily discontinue service, if such action is reasonably necessary, in such cases the telephone company must (A) promptly notify you of such temporary discontinuance, (B) afford you the opportunity to correct the condition and (C) inform you of your rights to bring a complaint to the FCC under their rules.
8. The telephone company may make changes in its communications facilities, equipment, operations or procedures, where such action is reasonably required in the operation of its business and is not inconsistent with FCC rules. If such changes can be reasonably expected to render the customer's devices incompatible with telephone company facilities, or require modification or alteration, or otherwise materially affect its performance, written notification must be given to the user, to allow uninterrupted service.

This device is verified to comply with Class A limits, part 15 of the Federal Communications Commission Rules and Regulations as a computing device. In order to comply with these FCC rules, the following instructions must be carefully read and applicable portions followed completely:

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

TABLE OF CONTENTS PAGE

INTRODUCTION

- TERMINAL COMPONENTS 1
- SETTING UP 1
- POWER CONSERVATION 2
- POWER FAIL RECOVERY 2
- TERMINAL STATUS TESTING 3
- SERVICING 3
- USER PRECAUTIONS 3
- USER MAINTENANCE 4
  - Power Failure 4
  - Cleaning 4
- OPERATING CONTROLS 5
  - Soft Keys 5
  - Home Keys 5
  - Back Key 5
  - Help Key 5
  - Loudspeaker Volume Control 5

CLOCK

- CHANGING DATE AND TIME DISPLAY 6

ROTARY DIAL 7

TELEPHONE

- STANDARD TELEPHONE OPERATION 8
- PHONE SOFT KEYS 8
  - Hanging Up 8
  - Hold 8
  - Redialing Busy or Unanswered Calls 8
  - PBX Hook Flash 9
- ANSWER SOFT KEYS 9
  - Answering 9
  - Ignoring a Call 9
- BACK KEY 10
  - Completing an Interrupted Operation 10
  - Return to Home Keys 10
- DELAYED DIALING SOFT KEYS 11
  - Dialing a Number 11
  - Redialing a Number 12
- CALL TIMING 12
  - Elapsed Time Display 12
  - Display Call Timer Soft Key 12
- CHANGING RINGER 12
- USING A HEADSET 13

TELEPHONE DIRECTORY

- DIRECTORY ENTRIES 14
  - Types 14
  - Adding Directory Entries 14
  - Changing Directory Entries 15
- VIEWING THE DIRECTORY 15
  - Soft Key Access 15
  - Keyboard Access 15
- METHODS FOR DIALING DIRECTORY ENTRIES 16
  - Displayed Entries 16
  - Typed Name 16
  - Quick Access Numbers 16
  - Dialing Multiple Directory Entries 17
- EDITING DIRECTORY ENTRIES 17

TABLE OF CONTENTS

DELETING DIRECTORY ENTRIES.......... 17
PRINTING THE DIRECTORY.......... 18

TEXT MESSAGES

DESCRIPTION.......... 19
CREATING TEXT MESSAGES.......... 19
  Editing with the Keyboard.......... 20
  Editing with Soft Keys.......... 20
  Automatic Editing Features Using Paragraph Mode Soft Key.......... 21
MANAGING MESSAGES.......... 21
  Printing Text Messages.......... 22
  Sending Messages Over the Phone Line.......... 22
  Storing Text Messages on Tape.......... 22
  Displaying Text Messages Stored on Tape.......... 22
  Editing a Taped Text Message.......... 23

TAPE OPERATION

DESCRIPTION.......... 24
  Tape Cassettes.......... 24
VOICE TAPE RECORDER.......... 24
  Controls.......... 24
  Loading a Tape.......... 25
  Recording Dictation.......... 25
  Recording Phone Conversations on Voice Tape.......... 25
  Playing Tape Recordings.......... 25
  Unloading Voice Tapes.......... 25
FORMATTED TAPE FEATURES.......... 26
  Formatting a Tape.......... 26
  Recording Voice Messages on a Formatted Tape.......... 26
  Recording Phone Conversations on a Formatted Tape.......... 27
  Recording Text Messages on a Formatted Tape.......... 27
  Unloading a Formatted Tape.......... 27
  Using Previously Formatted Tapes.......... 27
  Displaying the Tape Index.......... 28
  Reviewing Taped Messages.......... 28
  Manipulating a Reviewed Text Message.......... 28
  Playing Voice Messages Over the Phone Line.......... 29
PRINTING THE INDEX FOR A FORMATTED TAPE.......... 29
CLOSING THE TAPE DRIVE DOOR.......... 29
RECORDER MAINTENANCE.......... 30
  Cleaning.......... 30
  Demagnetizing.......... 30

AUTOMATICALLY SENDING A MESSAGE

OPERATION.......... 31
SENDING A MESSAGE FROM THE MESSAGE MEMORY.......... 31
  Entering a Time and Date.......... 31
  Entering Phone Numbers.......... 31
  Saving the Entry.......... 32
SENDING TEXT OR VOICE MESSAGES FROM A FORMATTED TAPE.......... 32
CHECKING MESSAGE STATUS.......... 32
  Displaying the Entry.......... 32
ADDING A NEW MESSAGE.......... 33
DELETING OR REPLACING A MESSAGE ENTRY.......... 33
CHANGING A MESSAGE ENTRY.......... 33
CREATING A NEW VOICE MESSAGE.......... 33

HOW A MESSAGE IS SENT.... 34
  Priority.... 34
  Stopping Automatic Message Send.... 34
  Delivered Messages.... 34
  Undelivered Messages.... 35

AUTOMATIC ANSWER

OPERATION.... 36
PRINTING MESSAGES.... 36
RECORDING MESSAGES ON A FORMATTED TAPE.... 37
  Entering Your Phone Number.... 37
  Reviewing Automatically Recorded Messages.... 38
ANSWERING WITH A VOICE MESSAGE.... 39
ANSWERING WITH MODEM-RS232.... 39

TEXT COMMUNICATION

OPERATION.... 40
  Making a Text Communication Call.... 40
  Correcting an Error in Mode Selection.... 40
TEXT DISPLAY MEMORY.... 41
  Memory Size.... 41
  Viewing Text in Memory.... 41
  Saving Text Messages Electronically.... 41
  Sending Stored Text Messages During a Call.... 42
MANUALLY ANSWERING TEXT CALLS.... 43
  Handset.... 43
  Answer the Phone Soft Key.... 43
TEXT TRANSMISSION MODES.... 44
  Key Transmit Modes (single character).... 44
  Line Transmit Mode.... 44
  Block Transmit Mode.... 44
  Changing Transmit Mode.... 44
  Transmit Soft Key.... 45
  USE XON/XOFF Soft Key.... 45
CONFIGURING THE MODEM.... 45
  Character Length.... 46
  Parity.... 46
PRINTING TEXT COMMUNICATION.... 46

REMOTE DATA TERMINAL

CALLING REMOTE COMPUTERS OR DATABASES OVER THE PHONE LINE.... 47
24 LINE MODEM DISPLAY.... 48
SEND BREAK SOFT KEY.... 48

COMPUTER TERMINAL

DIRECT ATTACHMENT TO COMPUTERS.... 49
USING THE RS-232 SERIAL PORT.... 49
24 LINE SERIAL PORT DISPLAY.... 49
SEND BREAK SOFT KEY.... 50
SIMULTANEOUS USE OF PHONE AND RS-232 SERIAL PORT.... 50
CONFIGURING THE RS-232 SERIAL PORT.... 51
  Character Length.... 51
  Parity.... 51
  Baud Rate.... 52
RS-232 SERIAL PORT TRANSMIT MODES.... 52
  Key Transmit Modes (single character).... 53
  Line Transmit Mode.... 53
  Block Transmit Mode.... 53
  Transmit Soft Key.... 53
  USE XON/XOFF Soft Key.... 54

TABLE OF CONTENTS

COPYING THE DISPLAY MEMORY CONTENTS.................................... 55
  Printing the Display Memory Contents................................. 55
  Copying in Message Memory.. 55
  Copying on Tape.. 56
CONNECTING THE RS-232 SERIAL PORT TO THE PHONE LINE MODEM............. 56
PREVENTING DATA OVERRUNS.. 56
CUSTOM FORMS DISPLAY.. 56
ASCII CONTROL CODES... 57

ELECTRONIC CALENDAR

TIME MANAGEMENT... 58
ADDING CALENDAR ENTRIES... 58
  Time Entries... 59
  Date Entries... 59
  Day Entries.. 59
  Completing the Entry... 59
SPACE AVAILABLE FOR ENTRIES... 59
REVIEWING CALENDAR ENTRIES.. 59
DELETING ENTRIES.. 60
EDITING ENTRIES... 60
ALARM REMINDERS... 60
PRINTING THE CALENDAR... 61

EXTERNAL PRINTER

CHARACTERISTICS... 62
OPERATION... 62

APPENDIX A

MESSAGE MEMORY AND DISPLAY MEMORY FEATURES............................ 63

APPENDIX B

MEMORY USAGE.. 65

APPENDIX C

ASCII AS NORMAL PHONE MODE.. 66
  Answering Calls.. 66
  Making Calls... 66

APPENDIX D

CUSTOM FORMS DISPLAY.. 67
ESCAPE SEQUENCES.. 67
  Cursor Control... 67
  Forms Control.. 68
  Dialing from Forms... 69
  Soft Key Control... 70
  Debugging Aids... 71
  Terminal Compatibility... 71
SCREEN ADDRESSING CHART... 72
  Examples... 72

APPENDIX E

PACKING INSTRUCTIONS.. 73

APPENDIX F

TERMINAL SPECIFICATIONS... 75

INDEX... 82

1 INTRODUCTION

THANK YOU ...

For selecting our terminal to meet your communication needs. We are confident that you will find your terminal's many features helpful in efficiently performing your activities. Our terminals have proven cost effective in a wide variety of work situations. You will undoubtedly discover unique methods of applying this product to meet your own needs which will enhance its value to you.

In reading this Manual and working with your terminal, you will discover that installation and use is very easy. It is important that you read these operating instructions thoroughly. By doing so you will understand all of the capabilities available to you and obtain the maximum benefit from use of the terminal.

After you have installed your terminal, according to the instructions which follow, read each section of this Manual and practice the procedures described. It is not necessary for you to learn how to operate all of the features of your terminal before you use it in your work. For example, you can immediately use it as a telephone. To answer calls, lift the handset. To make calls, lift the handset and dial using the keypad to the right of the display. If you prefer, you can learn how to operate those features which are most important to you and as you gain proficiency add others.

We are committed to providing advanced products of high quality which meet real and continuing communication needs. As a user of our products, we want you to know that we are also committed to the same standard of quality in meeting your future needs for service and support. We welcome your comments and suggestions on how we might serve you better.

1.1 TERMINAL COMPONENTS

After unpacking your terminal, you should review the accompanying packing list to assure that all items you ordered are on hand. Typically, the components which accompany the terminal display housing are a keyboard with coil cord attached, a handset with coil cord attached, a silver telephone line cord, and a literature package. DO NOT DESTROY YOUR PACKING LIST! You should keep the packing list for reference in case it is ever necessary for you to correspond with us in the future. The information on the packing list will help us to answer any questions you may have about your terminal.

Save the shipping carton your terminal came in. It is designed to protect your terminal during shipping and should be used if your terminal ever needs to be returned. (See Appendix E)

1.2 SETTING UP

Consider for a moment the best location for your terminal to meet your particular requirements. While this terminal replaces your standard telephone, the fact that it has a display and keyboard may require that you place it in a position different than your phone for maximum ease of use.

Avoid placing the display housing in a position where you will experience glare from windows or lights. Be sure you are seated at a comfortable height and can reach the handset and keys on the display housing without strain. While most users place the terminal on their primary work surface, you may want to consider another location such as a credenza or typing table.

Keep in mind that the main keyboard can be readily moved when you wish to use it. It can even be placed in your lap for casual operation.

Make sure you place the display housing of your terminal on a hard smooth surface. Avoid soft surfaces that might restrict the flow of air through the vents on the bottom of the unit. Always allow a minimum of one inch clearance behind the display housing to provide proper cooling. Never cover or block the air vents at the top rear of the housing. Proper cooling of the electronic components of your terminal is necessary for satisfactory operation and you should keep this in mind when locating the display housing in your work environment.

After you have determined the best use location for your terminal, take the following actions to place the terminal in operation:

1. Plug the handset or headset cord into the modular jack marked "HANDSET" on the rear of the display housing. If a handset is used, place it in the cradle on top of the display housing. If a headset is used, read section 4.8.

2. Plug the telephone line cord into the modular jack marked "LINE" on the rear of the display housing. Make sure the other end is properly connected to a telephone line.

3. Plug the keyboard coil cord into the modular jacks on the rear of the keyboard housing and the lower right front of the display housing. BE SURE THE MAIN POWER CORD TO THE DISPLAY HOUSING IS NOT PLUGGED IN WHILE ATTACHING OR DETACHING THE KEYBOARD.

4. Plug the power cord into a standard 110 volt AC grounded outlet.

5. Move the loudness control on the lower right front of the display housing to the center position. As you use the terminal, you can increase or decrease the ring loudness as desired.

6. If necessary, adjust the brightness of the display by turning the small knob marked "BRIGHTNESS" on the rear of the display housing.

Connection of a printer to the parallel printer port is covered in section 14 of this Manual.

Connection of your terminal to a computer through the RS-232 port is covered in section 12.

1.3 POWER CONSERVATION

If you do not use your terminal for a period of one hour, the display will go blank to reduce power consumption and prolong the life of your terminal. Pressing any key will cause the display to appear.

1.4 POWER FAIL RECOVERY

An internal backup battery prevents loss of data or the time when power to your terminal is off.

In most cases, the battery backed memory allows your terminal to restore operations interrupted by a power failure. Operations such as using the editor or making a directory entry are restored completely at the point of interruption. However, a power failure causes any phone call in progress to be terminated.

Your terminal continuously monitors the power line and will warn you of a low voltage condition by displaying "**** POWER FAIL ****". Operations are automatically suspended until normal power is restored.

1.5 TERMINAL STATUS TESTING

Automatic test features in the terminal software and hardware provide diagnostic information. Tests of the memory, power supply, and circuits are performed periodically. This allows partial failures and malfunctions to be detected during normal operations. These tests are also useful in servicing your terminal. Your terminal will notify you of any problems with a message on the display.

1.6 SERVICING

Servicing and repair of your terminal, other than those items covered under USER MAINTENANCE (1.8) and RECORDER MAINTENANCE (7.6), should only be done by an authorized service representative. DO NOT ATTEMPT TO REMOVE THE HOUSING OR ACCESS PANELS ON YOUR TERMINAL. To do so could expose you to a high voltage hazard as well as invalidate your warranty.

If you must return your terminal, carefully pack it in the original carton according to the instructions in section 19.

1.7 USER PRECAUTIONS

To avoid damage to your terminal never set coffee cups or other liquid containers on the terminal housing. If a spilled liquid does enter the display housing, unplug the power cord on your terminal immediately and contact an authorized service representative.

When moving the display housing, grasp it firmly on both sides with your fingers under the base. Do not attempt to move the display housing by pulling on the handset or keyboard coil cords or the power cord.

Always unplug the power cord before attaching or detaching the keyboard.

Never cut off the ground pin on the power plug. Always use a grounded 110VAC outlet.

1.8 USER MAINTENANCE

1.8.1 Power Failure

If your terminal ceases to operate and the display is completely blank when you press the space bar on the keyboard, check the power cord to make sure it is still plugged into a "live" electrical outlet. Next, check the circuit breaker on the rear of your terminal. The circuit breaker is located at the lower left when you face the rear of your terminal. If a small button is protruding from the circuit breaker, push it in to reset the breaker.

If you are unable to reset the circuit breaker or if power is present at the electrical outlet and the circuit breaker button is in but your terminal doesn't operate, contact an authorized service representative.

1.8.2 Cleaning

Never use abrasive or chemical cleaners on the housing or display screen of your terminal. Always unplug the power cord on your terminal before cleaning it. Use a damp (not wet) cloth with a mild soap solution. Never immerse any part of your terminal in water or other liquids.

Instructions on cleaning the tape drive mechanism of your terminal can be found in section 7.6.1.

1.9 OPERATING CONTROLS

1.9.1 Soft Keys

All features of your terminal are accessed and controlled by soft keys. The soft keys are the five keys across the bottom of the display. The term "soft key" means that the key does not have a fixed label. Instead, the key label depends on the operation in progress. The soft key labels appear on the display just above the keys.

The soft keys provide you with the available choices for each operation. Because the soft key labels are displayed, you do not have to memorize keywords or command sequences.

1.9.2 Home Keys

The soft key labels that appear when no functions are in progress are the HOME soft keys. The HOME keys are:

DIAL
PHONE DIRECTORY
MESSAGE
COMPUTER TERMINAL
MORE SELECTIONS

Dialing functions and many phone functions are initiated by pressing the DIAL key. Access to the built-in telephone directory is provided by the PHONE DIRECTORY key. The MESSAGE and COMPUTER TERMINAL keys provide access to message related functions and computer terminal functions respectively.

The MORE SELECTIONS key indicates that other operations are available. This key label appears whenever there are more than five possible selections.

Prompts and error messages are displayed on the display line above the soft key labels. This line will be referred to as the error line or prompt line.

1.9.3 Back Key

The BACK key, which is to the right of the soft keys, is used to return to the previous set of soft key labels. Multiple presses of the BACK key will return the soft key labels to the HOME keys. The BACK key is next to the HELP key.

1.9.4 Help Key

As an additional aid, there is a built-in HELP function. If you don't remember the meaning of a particular soft key, you can press the HELP key, which is next to the BACK key, and then press the soft key in question. You will see a one line definition of the soft key. After an initial orientation to your terminal, you should only need to use this handbook for the most complex operations.

1.9.5 Loudspeaker Volume Control

The loudness of the ringer and signals indicating the phone you are calling is busy or ringing can be adjusted with the sliding control at the lower right on the front of the display housing. Slide the control knob to the left to decrease the volume and to the right to increase it. The volume control does not affect the loudness of sounds you hear on the handset.

2 CLOCK

An internal, electronic clock allows your terminal to perform operations based on the time and date. The time keeping function has its own backup battery so the internal clock continues to run even when power to your terminal is off. The clock maintains the correct number of days for each month and allows for leap years.

The time of day, the day of the week, the month, date, and year appear on the display when it is not being used by another function. If you want to see the time when the display is blank, press the space bar on the keyboard.

2.1 CHANGING DATE AND TIME DISPLAY

To change the date and time displayed, press the MORE SELECTIONS soft key in the home keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press the soft key labeled CONFIGURATION SELECTIONS. The soft keys change to:

16 LINE MODEM DISPLAY	24 LINE MODEM DISPLAY	16 LINE SERIAL PORT DISPLAY	24 LINE SERIAL PORT DISPLAY	SET DATE AND TIME

Press the soft key labeled SET DATE AND TIME. You will see a prompt to enter the time and date. The present setting of the date and time is displayed as an example of the format required. The soft keys displayed are:

CLEAR	INSERT	DELETE	SAVE

Enter the time and date using the keyboard. Mistakes can be corrected using the editing soft keys and the backspace key on the keyboard. The left and right arrow keys on the keyboard can be used to position the cursor on the display. Pressing the space bar on the keyboard will blank characters over the cursor. Press the SAVE soft key or the RETURN key on the keyboard to set the clock with the new time and date. If an incorrect entry is made, you will hear a beep and see an error message describing the mistake. The day of the week is automatically calculated for the date and year you enter. The time and date you enter must include a colon in the time and a comma in the date, as shown below, or you will see an error message. Months can be spelled out or abbreviated with three letters as shown.

6:07 pm Jul 30, 1982

If the telephone which your terminal is replacing uses tone dialing you need not read this section.

However, if pulses rather than tones are output when the phone to be replaced is dialed then you must set your terminal to operate in a rotary dial mode. To do this, press the MORE SELECTIONS soft key in the home keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press the soft key labeled PHONE SELECTIONS. The soft keys change to:

CHANGE RINGER	CHANGE NORMAL PHONE MODE	CHANGE MY PHONE NUMBER		SYSTEM REVISION

Press the key labeled CHANGE NORMAL PHONE MODE. The soft keys change to:

VOICE	ASCII	ROTARY DIAL	HANDSET	HEADSET

Press the key labeled ROTARY DIAL. The label will be underlined. When you dial, your terminal will now output pulses rather than tones.

Press the BACK key until you return to the HOME soft keys.

4.1 STANDARD TELEPHONE OPERATION

You can use your terminal like a standard telephone.

To place a call, (1) pick up the handset, (2) listen for dial tone and (3) dial the desired number on the keypad (located to the right of the display).

To answer a call - pick up the handset.

To hang up - place the handset in the cradle.

4.2 PHONE SOFT KEYS

While you are using the phone for a voice call which you initiated, the soft keys change to:

HANG UP	HOLD	REDIAL	HOOK FLASH	CHANGE CALL MODE

4.2.1 Hanging Up

Pressing HANG UP ends a call. (The handset does not have to be in the cradle to hang up using the HANG UP key).

4.2.2 Hold

Pressing the HOLD soft key allows you to speak without having a caller hear you. HOLD will be underlined when it is on. To take a call off hold, press the HOLD key again. Placing the handset in its cradle when hold is on will not hang up your phone.

4.2.3 Redialing Busy or Unanswered Calls

Numbers that are busy or not answered can be automatically redialed. You can monitor the progress of your call using the loudspeaker or the handset. If there is no answer or the line is busy, press the REDIAL soft key. After a short pause, your terminal will hang up, redisplay the HOME soft keys and display the message "Redial in 1 minute" if it detected busy tone or "Redial in 15 minutes" if busy tone was not detected.

The REDIAL key can also be used to call someone back after 15 minutes. This is done by pressing the REDIAL soft key. Pressing the REDIAL soft key also hangs up the phone.

One minute or fifteen minutes later, you will hear a beep and the display will show:

Redial (number to redial)?

YES	NO

If REDIAL is still desired, press the YES key, the RETURN key on the keyboard, or pick up the handset. It is not necessary to pick up the handset to listen to the progress of the call. You will be able to hear the phone you are calling ring or a busy signal through the built-in loudspeaker on your terminal. To cancel REDIAL, press the NO key. If no response is given within 15 seconds, REDIAL is automatically cancelled.

If YES is selected and the line is still busy or there is no answer, you can press REDIAL again.

If your phone is in use when a REDIAL time occurs, nothing will happen until you hang up. REDIAL is also postponed if the RS-232 serial port is in use.

The REDIAL soft key is not present during calls which you receive.

4.2.4 PBX Hook Flash

The HOOK FLASH soft key is only used if your terminal is attached to a private branch exchange (PBX). When HOOK FLASH is pressed the typical PBX will put a call on hold and provide a new dial tone. A new number can then be dialed and the call transferred or a conference call can be held.

If your terminal is attached to a PBX, follow the instructions for using a standard telephone to access PBX features. Just press the HOOK FLASH soft key whenever the instructions for your PBX tell you to depress the switch in the handset cradle (hook switch) of the phone you previously used.

4.3 ANSWER SOFT KEYS

When there is an incoming call, the soft keys change to:

```
                    ANSWER                    IGNORE
                   THE PHONE                 THIS CALL
```

The above soft keys are not displayed if you are using the terminal to interact with an in-house computer when a call comes in. You may answer a voice call without interrupting the data terminal activity by picking up the handset.

4.3.1 Answering

Normally a call is answered by picking up the handset. For text calls and when using a headset, press the ANSWER THE PHONE soft key. If the ANSWER THE PHONE soft key is not displayed when the phone rings, press the BACK key repeatedly until you see the ANSWER THE PHONE soft key.

4.3.2 Ignoring a Call

Press the IGNORE THIS CALL soft key to stop the ring signal. The calling party will still hear the ringback signal indicating that your phone is ringing. The home soft keys will change to:

```
  ANSWER        PHONE        MESSAGE      COMPUTER       MORE
 THE PHONE    DIRECTORY                   TERMINAL    SELECTIONS
```

The call can still be answered by picking up the handset or by pressing the ANSWER THE PHONE soft key before the calling party hangs up. If the calling party hangs up, the ANSWER THE PHONE soft key label will change to DIAL.

4.4 BACK KEY

4.4.1 Completing an Interrupted Operation

Press the BACK key to restore the soft keys for an operation in progress if they are changed by an incoming phone call. The ring signal will continue as long as there is an incoming call. You can complete what you were doing and then answer the call by picking up the handset or by returning to the HOME keys and pressing the ANSWER THE PHONE soft key.

4.4.2 Return to Home Keys

Pressing the BACK key one or more times will return the soft keys to the HOME keys if you want to perform other functions while on the phone. DIAL is replaced in the HOME keys by a key labeled PHONE KEYS. Pressing PHONE KEYS changes the soft keys to the labels you normally see during a phone call:

HANG UP	HOLD	REDIAL	HOOK FLASH	CHANGE CALL MODE

The REDIAL soft key will not appear unless you originated the call.

4.5 DELAYED DIALING SOFT KEYS

4.5.1 Dialing a Number

Using the delayed dialing feature, you can enter numbers and check them before dialing. To use delayed dial, press the DIAL key in the HOME keys. The soft keys change to:

DIAL THE NUMBER
DIAL LAST NUMBER

and the display shows the prompt:

Enter phone number or name.

_

Enter a phone number using the keypad or the keyboard number keys. If you make a mistake, use the backspace key on the keyboard or the left and right arrow keys on the keyboard to position the cursor under the incorrect digit. Enter the correct digit.

After entering the phone number correctly, press the DIAL THE NUMBER soft key or pick up the handset. (Your terminal will access your phone line, wait for dial tone and dial the sequence of digits). You can also start dialing by pressing the RETURN key on the keyboard.

If you do not pick up the handset, you will hear dial tone, a series of tones indicating your terminal is dialing, then ringback or a busy signal on the loudspeaker. When the called party answers, or at any time during the dialing sequence, you can pick up the handset.

In situations where you must pause or wait for a second dial tone, this can be done automatically by entering the special symbols * and # using the keypad. The * symbol causes your terminal to wait for a dial tone before continuing to dial. More than one * can be used if it takes longer than 5 seconds to obtain a dial tone. The # inserts a five second pause in the dialing sequence. More than one # can be used for longer pauses. These symbols can also be entered from the keyboard. You can also insert blanks and dashes (-) in the phone number so long numbers are more readable on your display. For example, the following numbers and symbols might be entered if you had to dial 9 to reach an outside line through a PBX, wait for a dial tone and then dial the phone number you wished to call. The number might include an MCI or other access code as shown below.

```
              Local Number      MCI Access Code   Long Distance Number
             ┌──────┴──────┐    ┌──────┴─────┐   ┌──────────┴─────────┐
       9 * 4 8 4 - 6 9 0 0 # # 9 7 1 2 3    3 1 2 - 5 5 2 - 9 6 0 0
  ┌──────────┴───────────┐ ┌──────┴───────┐
  Wait for Dial Tone       Two 5 sec. pauses
```

When dialing, the soft keys change to:

HANG UP

When dialing is completed, the soft keys change to:

HANG UP
HOLD
REDIAL
HOOK FLASH
CHANGE CALL MODE

If no dial tone is detected within five seconds either initially or after a * symbol, you will hear a beep and the display will show "No dial tone present".

4.5.2 Redialing a Number

When a phone number is dialed, it is also saved. If you wish to call the number again, press the DIAL soft key in the HOME keys. The soft keys change to:

DIAL THE NUMBER	DIAL LAST NUMBER

Press the DIAL LAST NUMBER soft key.

4.6 CALL TIMING

4.6.1 Elapsed Time Display

While a call is in progress, if the display is not being used for other operations, the elapsed time of the call is displayed as shown below:

Time of call - 01:25:06 (1 hour, 25 minutes, 6 seconds)

4.6.2 Display Call Timer Soft Key

The timer is started when you place or answer a call. After hanging up, the elapsed time of the call can be displayed by pressing MORE SELECTIONS in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Now press the DISPLAY CALL TIMER soft key. The time is retained until the next phone call which exceeds ten seconds in length.

4.7 CHANGING RINGER

If you prefer a different ringer tone or a short beep instead of the ring signal, press MORE SELECTIONS in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press the PHONE SELECTIONS soft key to get:

CHANGE RINGER	CHANGE NORMAL PHONE MODE	CHANGE MY PHONE NUMBER		SYSTEM REVISION

Press the CHANGE RINGER soft key. The soft keys change to:

RINGER TONE 1	RINGER TONE 2	RINGER TONE 3	RINGER TONE 4	BEEP FOR RING

The current ring tone will be underlined. To change the ring tone, press any of the ringer tone soft keys. You will hear an example of the tone as you press the soft key.

If you press the BEEP FOR RING soft key so its label is underlined, your terminal will beep the selected tone instead of sounding the normal ring signal. To restore the normal ring, press BEEP FOR RING again. The key label will no longer be underlined.

4.8 USING A HEADSET

To use a headset, press the MORE SELECTIONS soft key in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press PHONE SELECTIONS to change the soft keys to:

CHANGE RINGER	CHANGE NORMAL PHONE MODE	CHANGE MY PHONE NUMBER		SYSTEM REVISION

Press CHANGE NORMAL PHONE MODE. The soft keys change to:

VOICE	ASCII	ROTARY DIAL	HANDSET	HEADSET

Press the soft key labeled HEADSET. The underline will move from the HANDSET soft key label to the HEADSET soft key label.

Now the handset can be removed by unplugging the handset cord from the modular jack on the rear panel. Install the headset by plugging it into the same modular jack.

To return to handset use, plug in the handset and go to the CHANGE NORMAL PHONE MODE soft keys. Press the HANDSET soft key.

5 TELEPHONE DIRECTORY

5.1 PHONE DIRECTORY ENTRIES

5.1.1 Types

You can store frequently used telephone numbers in your terminal's electronic directory. A directory entry can be a phone number up to 40 digits long and a name up to 30 characters long. The name must begin with a letter. The symbols for dial tone delay (*) and pause (#) can be included in the number. A number from 1 to 9, which allows you to quickly access the entry by pressing a number key on the keyboard, can also be included with the entry.

An entry with a 15 letter name and a 10 digit phone number is typical. The directory memory is large enough to accommodate more than 60 entries of typical size. If entries are shorter, more entries can be made. If a larger directory is desired refer to section 16 for additional information.

5.1.2 Adding Directory Entries

The directory is accessed by pressing PHONE DIRECTORY in the HOME soft keys. The soft keys are relabeled for directory operations.

DIAL THE NUMBER	ADD NEW ENTRIES	EDIT THE ENTRY	DELETE THE ENTRY	DISPLAY MORE ENTRIES

To add phone numbers to the directory, press the ADD NEW ENTRIES soft key. The display will show a prompt to enter a name, quick access number and phone number. Type in the name to be stored with the entry. A name must begin with a letter and can be up to 30 characters long. Since directory entries are displayed in alphabetical order, the first word you enter will be the one alphabetized. The name is entered using the keyboard. When you press the RETURN key or the TAB key on the keyboard, the cursor will move to the location for entering a quick access number. A quick access number must be a single digit from 1 to 9. You don't have to enter a quick access number. Pressing RETURN again will move the cursor to the line where you enter the phone number to be called. The number to be called can be up to 40 characters long using the digits 0-9, blanks, dashes (-), or the symbols * and #.

Enter the number and then press the RETURN key on the keyboard or the SAVE soft key to store the entry in the directory. Your terminal will continue to prompt you for more new entries. If you make an incorrect entry, or enter a duplicate name or quick access number, you will hear a beep and see an error message.

When you have finished adding directory entries, press the BACK key until you return to the HOME soft keys.

5.1.3 Changing Directory Entries

While adding directory entries, the soft keys are labeled:

CLEAR INSERT DELETE SAVE

The CLEAR soft key clears the line containing the cursor and allows you to re-enter the information.

Pressing the INSERT soft key allows you to insert characters. The word INSERT is underlined and the cursor changes to a blinking white rectangle. When you enter characters they are inserted at the position prior to the cursor. To restore the normal cursor press the INSERT soft key again.

Pressing the DELETE soft key deletes the character at the cursor position. Continuing to hold the DELETE key down will automatically delete characters to the right of the cursor.

The cursor can be moved using the left and right arrow keys and the up and down arrow keys on either side of the keyboard space bar.

The TAB key on the keyboard or the RETURN key on the keyboard can be used to move the cursor to the next item to be entered.

After changing a directory entry, press the RETURN key on the keyboard or the SAVE soft key to store the entry in the directory.

5.2 VIEWING THE DIRECTORY

5.2.1 Soft Key Access

When you press the PHONE DIRECTORY key in the HOME soft keys, four directory entries are displayed on the screen with the names in alphabetical order. The top entry is underlined. Pressing the down arrow key on the keyboard moves the underline to the next entry. If the down arrow key is pressed when the underline is on the bottom entry, the displayed entries are scrolled. Continuing to press the down arrow key will scroll the directory until the last entry is reached. Pressing the up arrow key on the keyboard moves the underline to the previous entry. If the up arrow key is pressed when the underline is on the top entry, the directory will scroll until the first entry is reached.

The DISPLAY MORE ENTRIES soft key is used to scroll through the directory four entries at a time. To return quickly to the beginning of the directory, press the A key on the keyboard.

5.2.2 Keyboard Access

The A to Z keys on the keyboard can be used as quick tabs into the directory without first pressing the PHONE DIRECTORY soft key. This can also be done while directory entries are displayed. Pressing a letter key causes directory entries starting with that letter to be displayed or the next entry in alphabetical order if no entries exist with that letter. To quickly find a particular entry, press a letter key and then the down arrow key to move the underline to the entry you wish to dial.

When you use a letter key to access the directory, your terminal will display the directory for five seconds. To continue the display, press the up or down arrow keys or an appropriate soft key.

5.3 METHODS FOR DIALING DIRECTORY ENTRIES

5.3.1 Displayed Entries

The first step in dialing a directory entry is to view the directory. Then use the up and down arrow keys on the keyboard to move the underline to the name and number you wish to call. To start dialing, lift the handset, press the DIAL THE NUMBER soft key or press the RETURN key on the keyboard.

5.3.2 Typed Name

Directory entries can also be dialed by typing a directory entry name. You do this by pressing the DIAL key in the HOME keys. The soft keys change to:

DIAL THE NUMBER	DIAL LAST NUMBER

and the display shows:

```
Enter phone number or name.

_
```

Type the name you wish to dial on the keyboard. Lift the handset, press the DIAL THE NUMBER soft key or press the RETURN key on the keyboard to dial the entry. If the name is not in the directory or you enter it incorrectly, you will see an error message.

5.3.3 Quick Access Numbers

Quick access numbers from 1 to 9 can be stored with nine frequently used directory entries to allow you to quickly display these entries. When no other operations are in progress, pressing a number key from 1 to 9 on the top row of the keyboard will cause the directory entry with that quick access number to be displayed. The soft keys change to:

DIAL THE
NUMBER

The quick access entry will be displayed for five seconds. The telephone number of the entry will be dialed if you lift the handset, press the DIAL THE NUMBER soft key or press the RETURN key on the keyboard during that time.

The entry is displayed for five seconds so you can verify that the correct quick access number was selected. If the entry is not the one you desire, press another number key to display another entry. If no entry is associated with a particular number key, you will see an error message on the display.

5.3.4 Dialing Multiple Directory Entries

It is sometimes necessary to dial more than one number or access code when using a long distance service such as MCI or Sprint. These access codes can be stored as separate entries. You can then dial the code after the number for the long distance service has been dialed. Any directory entry can also be dialed after gaining access to the long distance service.

To dial directory entries and other numbers in succession, begin by dialing the first number using any of the methods previously described. Additional digits can then be dialed using the keypad, by pressing a quick access number key or by pressing a letter key to enter the directory and then selecting an entry by moving the underline to the one desired. Don't start dialing with the keypad until the previous dialing is complete.

5.4 EDITING DIRECTORY ENTRIES

To edit a directory entry, press the PHONE DIRECTORY soft key and then move the underline cursor so it is under the entry to be changed. Press the EDIT THE ENTRY soft key. You will see the information for the underlined entry. The cursor will be located on the name line. Move the cursor to the item to be changed with the up and down arrow keys, the TAB key or the RETURN key on the keyboard. Edit the entry with the keyboard. Press the SAVE soft key to store the edited entry in the directory.

If you have done some editing and decide to leave the entry as it was originally, press the BACK key and the directory entry will not be changed.

While editing a directory entry, the soft keys provide the same editing functions as with ADD NEW ENTRIES.

CLEAR   INSERT   DELETE   SAVE

The CLEAR soft key clears the line containing the cursor and allows you to re-enter information.

Pressing the INSERT soft key allows you to insert characters. The word INSERT is underlined and the cursor changes to a blinking white rectangle. When you enter characters they are inserted at the position prior to the cursor. Pressing INSERT again removes the underline and restores the normal cursor.

The DELETE soft key deletes the character at the cursor position.

The cursor can be moved using the left and right arrow keys and the up and down arrow keys on either side of the keyboard space bar.

Pressing the SAVE soft key stores the entry no matter where the cursor is located.

5.5 DELETING DIRECTORY ENTRIES

Pressing the DELETE THE ENTRY soft key removes the underlined entry from the directory. The memory space used by the deleted entry becomes available for new entries.

5.6 PRINTING THE DIRECTORY

As an aid in keeping track of directory entries you can make a paper copy of the directory contents if your terminal has an external printer attached.

To print the directory, press MORE SELECTIONS in the HOME soft keys. The soft change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Now press the PRINTER SELECTIONS soft key. The soft keys change to:

PRINT CALENDAR	PRINT PHONE DIRECTORY	PRINT TAPE INDEX

Press the PRINT PHONE DIRECTORY soft key to print all the directory entries on your external printer.

6 TEXT MESSAGES

6.1 DESCRIPTION

You can use the text message function to create memos, letters, announcements and other short written material. These messages can be sent over your phone line to other terminals after you have composed them or you can make printed originals if you have a printer attached to your terminal. Text messages can also be stored on a cassette tape for later display on your terminal or for automatic transmission to another terminal.

Text messages are composed and edited in a message memory which can hold 56 lines of text with 80 characters on each line. An 8.5 by 11 inch sheet of paper is just filled by this amount of text. The contents of the message memory are saved during all other operations as well as during a power failure.

In later sections, reference will be made to the display memory which is used primarily for text communication over the phone line or communication with computers over the RS-232 serial port. It is important that you understand the difference between the message and display memories. A thorough discussion can be found in section 15.

6.2 CREATING TEXT MESSAGES

To compose or edit a message, press the MESSAGE soft key in the HOME keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the MESSAGE EDITOR soft key. The soft keys change to:

CLEAR	INSERT	DELETE	EDITOR SELECTIONS	MESSAGE SELECTIONS

Any message currently stored in the message memory will be displayed. Thirteen lines of the message are shown on the display. The up and down arrow keys on the keyboard allow you to scroll the message on the display until the beginning or end of the memory is reached.

Messages are composed by typing on the keyboard plugged into the display housing. Characters typed on the keyboard are displayed at the cursor position. If you hold a key down, it will be repeated at a rate of 10 per second after a one second delay. The keyboard layout is similar to that of a standard typewriter. One difference from a standard typewriter keyboard is the LOCK key which contains a light emitting diode (LED). When the LOCK key is pressed and the LED is lit, all alphabetic characters will be typed as capitals. The LOCK key is not a "shift lock" key. It has no effect on numeric or symbol keys.

6.2.1 Editing with the Keyboard

The following features for composing and editing messages are provided by keyboard keys. Many of these keys are also used when creating calendar and phone directory entries.

Correcting Errors: To correct simple typing errors, press the backspace key. A blank will be placed at the current cursor position and the cursor moved back one space. A blank is placed at the new position.

Moving to Tab Positions: Pressing the tab key on the keyboard moves the cursor to the next tab position. (See Setting and Clearing Tabs in section 6.2.2.)

Positioning Cursor in a Line: Use the left and right arrow keys to position the cursor within a line. Each key press will move the cursor left or right one character position. Pressing the right arrow key with the cursor at the end of a line will move the cursor to the start of the next line. Pressing the left arrow key with the cursor at the start of a line will move the cursor to the end of the previous line.

Moving Cursor Rapidly in a Line: To move the cursor rapidly within a line, hold the SHIFT key down and press the left or right arrow key. Each key press will move the cursor left or right five character positions.

Moving Cursor From Line to Line: Use up and down arrow keys to move the cursor vertically from line to line. Press the down arrow key with the cursor in the last display line to scroll the display area until the last line in the message memory is reached. Similarly, press the up arrow key with the cursor in the top display line to scroll the display area until the first line in the message memory is reached.

Moving to First Character Position in Message Memory: Pressing the up arrow key while holding down the SHIFT key moves the cursor to the first character position of the display and displays the first line in the message memory.

Moving to Last Line in Message Memory: Pressing the down arrow key while holding down the SHIFT key moves the cursor to the start of the last line in the message memory.

6.2.2 Editing with Soft Keys

Clearing a Line: Pressing the CLEAR soft key clears the line containing the cursor by replacing all characters with blanks.

Clearing the Message Memory: Pressing the CLEAR soft key while holding down the SHIFT key replaces all characters from the cursor position to the end of the message memory with blanks. Pressing SHIFT with the UP Arrow key followed by SHIFT with the CLEAR soft key will blank the entire message memory. The entire message memory can also be blanked by pressing the "L" key while holding down the CTRL key.

Inserting Characters: Pressing the INSERT soft key allows characters to be inserted at the cursor position. While in insert mode, INSERT is underlined and the cursor is changed to a white blinking rectangle. To get out of insert mode, press the INSERT key again. This will remove the underline and restore the normal cursor. Insert mode is automatically turned off whenever you move the cursor to a new line. While insert mode is on, keyboard entries will shift all characters to the right of the cursor, on the same line, to the right. To avoid losing characters at the end of the line, press the PARAGRAPH MODE soft key which is reached by pressing the EDITOR SELECTIONS soft key.

Inserting Blank Lines: By pressing the INSERT soft key while holding the SHIFT key down, a blank line will be inserted above the line containing the cursor. If the last line in the message memory is not blank, a new line cannot be inserted.

Deleting Characters at Cursor Position: Pressing the DELETE soft key deletes the character at the cursor position. The delete operation will be repeated 10 times per second after an initial delay of one second if the DELETE soft key is held down.

Deleting Characters in Front of Cursor: Pressing the BACKSPACE key while in the insert mode deletes the character in front of the cursor. The delete operation will be repeated 10 times per second after an initial delay of one second if the BACKSPACE key is held down.

Deleting Lines: Pressing the DELETE soft key while holding down the SHIFT key will delete the line containing the cursor. A new blank line is added to the end of the message memory.

Setting And Clearing Tabs: Pressing the EDITOR SELECTIONS soft key changes the soft keys to:

SET TAB   CLEAR TAB   PARAGRAPH MODE

Tab positions can be set by locating the cursor at the desired position and pressing the SET TAB soft key. To clear a tab position, locate the tab by pressing the TAB key, then press the CLEAR TAB soft key. Press the BACK key to return to the editor keys.

6.2.3 Automatic Editing Features Using Paragraph Mode Soft Key

Pressing the PARAGRAPH MODE soft key so its label is underlined provides the following features.

When inserting or deleting characters, words are automatically shifted left or right and from line to line. To prevent words from being split between the end of one line and the start of the next line, words are shifted intact between lines. When a character is inserted and the last character in the line is not blank, the entire last word in the line is moved to the next line. Similarly, when a character is deleted and enough room exists at the end of the line, the first word of the following line will be moved up to the end of the current line.

A blank line should always be inserted between paragraphs to prevent words from shifting from one paragraph to another when inserting or deleting characters. The blank line stops the word shifting process and allows paragraphs to be maintained separately.

6.3 MANAGING MESSAGES

Messages you create with the message editor may be printed, stored on tape or sent over either the phone line or serial port. These features are accessed by pressing the MESSAGE SELECTIONS soft key in the message editor keys. The new soft keys displayed are:

PRINT MESSAGE   SEND MESSAGE   READ MESSAGE FROM TAPE   WRITE MESSAGE TO TAPE   COPY FROM MODEM OR PORT

6.3.1 Printing Text Messages

When an external printer is connected to your terminal, the PRINT MESSAGE soft key can be used to print the contents of the message memory starting at the cursor position. This is convenient for making a paper copy of a message before it is sent over the phone line or making a copy to be mailed.

6.3.2 Sending Messages Over the Phone Line

A text message stored in the message memory may be sent over the phone line to another terminal. This can be done during either a voice or text communication. The SEND MESSAGE soft key can only be used when it is accessed from the MESSAGE EDITOR soft key associated with text communication. See section 10.2.4 for details.

6.3.3 Storing Text Messages on Tape

After composing a text message, pressing the WRITE MESSAGE TO TAPE soft key when a formatted C60 tape cassette is loaded (See section 7) will cause the message to be copied from the message memory on to the tape. As the copying process is taking place, you will hear the tape drive running and the display will show "Positioning the tape" and then "WRITING TEXT MESSAGE" along with the message number and the time and date recorded. Your terminal will assign a number to your message.

Since you will need the message number to recover your message from the tape, you should write the number down and identify the message contents. A good place to do this is on the paper insert which comes with each tape cassette holder.

While your message is being recorded, the soft keys will be:

ABORT TAPE
OPERATION

After your message has been recorded the soft keys return to:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

Press the BACK key to reach the editor soft keys. The cursor will appear at the last character of your message after it has been copied on the tape. Holding down the SHIFT key on the keyboard, and then pressing the up arrow key on the keyboard will move the cursor to the first character. Then holding down the SHIFT key and pressing the CLEAR soft key will erase the message memory so you can create a new message.

You can store approximately thirty text messages or pages, each fifty-six lines long, on one side of a C60 tape.

6.3.4 Displaying Text Messages Stored on Tape

Text information stored on a formatted tape in your terminal's tape drive can be copied in the message memory and displayed. To do this, press the MESSAGE soft key in the HOME keys. Press the MESSAGE EDITOR soft key and then the MESSAGE SELECTIONS soft key. The soft keys change to:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

Press the READ MESSAGE FROM TAPE soft key. The display will show the first eight text entries on the tape. Use the down arrow key on the keyboard to move the underline from the first entry to the entry you wish to display. The soft keys displayed are:

READ THIS
MESSAGE

Press the READ THIS MESSAGE soft key. Your terminal will position the tape at the beginning of the selected message, copy it in the message memory and then display it. While the message is being displayed, the soft keys are:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

After reviewing a message, the READ MESSAGE FROM TAPE soft key can be used to return to the tape index display of text messages and soft keys. Pressing the ABORT TAPE OPERATION soft key while the message is being copied in the message memory will stop the operation.

6.3.5 Editing a Taped Text Message

If you wish to edit the message, press the BACK key. The soft keys will change to:

CLEAR	INSERT	DELETE	EDITOR SELECTIONS	MESSAGE SELECTIONS

After editing a message, you can store it on the loaded tape in addition to the unedited version of the message already stored there or you can store it on a different formatted tape. (See section 6.3.3 for details.) You can also print the edited message or send it over the phone line to other terminals.

An example of how this feature may be used is the preparation of standard format messages to be sent to various locations. A series of form messages or letters can be stored on formatted tapes. A particular message is then read from the tape into the message memory where you add a name, address and date. The message is then printed for mailing or sent over the phone line to another terminal.

7.1 DESCRIPTION

Your terminal's capabilities are enhanced by a built-in cassette tape drive. Cassette tapes can be used to:

1. Record dictation
2. Record voice phone conversations
3. Play recorded voice phone conversations and other recordings over the phone line to others
4. Store text messages you create or receive from others
5. Record voice messages to be played when your terminal automatically answers calls
6. Record voice or text messages from callers when your terminal automatically answers calls
7. Automatically send up to seven recorded voice or text messages at specified times to multiple locations

7.1.1 Tape Cassettes

The first three applications above can be accomplished using any standard tape cassette up to C90 in length. (Never use C120 or C180 tapes. These tapes can easily break and may jam your tape drive.) All the other applications listed above require the use of high quality C60 cassettes. We recommend that you use certified tape cassettes of the type shipped with your terminal or an equivalent quality cassette. Each C60 cassette must be formatted by your terminal before being used for applications four through seven. See section 7.3.1 for details.

7.2 VOICE TAPE RECORDER

Your terminal can be used as a voice tape recorder and playback unit when you wish to record dictation or phone conversations. Any standard tape cassette, C90 or less in length, can be used for these functions. These tapes need not be formatted by the terminal before use. The voice tape recorder mode can also be used to play commercially available music and informational tapes.

7.2.1 Controls

You control the voice recording and playback functions with the soft keys. To reach the recorder control soft keys, press the MESSAGE soft key in the HOME soft keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the VOICE TAPE RECORDER soft key. The soft keys change to:

RECORD	PLAY	EJECT	FAST FORWARD	REWIND

These are the soft keys which control the voice recording and playback functions.

7.2.2 Loading a Tape

Pressing the EJECT soft key will open the tape drive door so you can load a cassette. Slide the tape cassette into the cover with the exposed portion of the tape toward the terminal. Gently press down the tape drive cover until you hear it latch. Under no circumstances should you attempt to force the tape drive cover closed. If you encounter resistance, press the EJECT soft key again and then try to close the cover.

After loading a tape cassette and closing the tape drive door, press the REWIND soft key. This will cause the tape to be rewound and will reset the tape counter on the display to zero.

The tape counter display will give a rough indication of your location on the tape while you are recording, fast forwarding or rewinding. Since most cassette tapes have a leader at the beginning of the tape which cannot be recorded on, you should wait until the tape counter reads "0010" before you start recording.

7.2.3 Recording Dictation

You can dictate using your terminal's telephone handset. After pressing the VOICE TAPE RECORDER soft key, lift the handset. The phone will not be on as long as the voice tape recorder soft keys are displayed. Press the RECORD soft key and speak into the handset to start recording. The soft keys change to:

RECORD	PLAY	STOP	FAST FORWARD	REWIND

The RECORD soft key label will be underlined while recording is taking place. You can stop recording by pressing the STOP soft key or by pressing one of the other soft keys. Dictation on an unformatted tape can be played back on any standard dictating machine which uses cassette tapes.

7.2.4 Recording Phone Conversations on Voice Tape

If you wish to record a phone conversation in progress, press the BACK key to display the HOME soft keys. Then press the MESSAGE soft key followed by the VOICE TAPE RECORDER soft key. Now you can start recording at any point in the conversation by pressing the RECORD soft key. RECORD will be underlined while recording is taking place. To turn off the recorder, press the STOP soft key.

7.2.5 Playing Tape Recordings

To play a tape recording, press the PLAY soft key after rewinding the tape. If the handset is in the cradle on top of the display housing, you will hear the recording through the loudspeaker. Use the volume control under the speaker grill to increase or decrease loudness. Lifting the handset will turn the loudspeaker off and you will hear the recording through the handset.

If a telephone call is in progress or initiated when a tape is played, the recording will also be played over the phone line.

7.2.6 Unloading Voice Tapes

With an unformatted tape loaded in the tape drive, pressing the EJECT soft key when the tape is stopped will open the tape drive door and allow you to remove the tape. If the tape is moving, the EJECT soft key is replaced by the STOP soft key.

7.3 FORMATTED TAPE FEATURES

Any C60 cassette tape can be formatted by your terminal. We recommend, however, that you use certified tape cassettes of the type shipped with your terminal. A formatted tape allows voice and text messages to be sequentially recorded on the same tape. It also allows your terminal to display an index of all messages recorded on a tape so you can select those you wish to hear or see displayed. Each tape index can hold up to forty entries.

7.3.1 Formatting a Tape

To format a new tape or reformat a used tape, insert the tape cassette in the tape drive and close the tape drive cover. Press the MESSAGE soft key in the HOME soft keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the FORMATTED TAPE OPERATIONS soft key. The soft keys change to:

FORMAT TAPE	LOAD FORMATTED TAPE	EJECT

Press the FORMAT TAPE soft key. Your terminal will check to make sure you have loaded a tape. If you have not loaded a tape, the terminal will prompt you to do so. Pressing the FORMAT TAPE soft key causes the tape to be rewound and formatted so the index shows no messages present on the tape. After the formatting operation is completed the soft keys change to:

FORMAT TAPE	REVIEW MESSAGES	UNLOAD FORMATTED TAPE	RECORD VOICE MESSAGE

7.3.2 Recording Voice Messages on a Formatted Tape

In addition to dictating on unformatted tape, you can record voice messages on formatted tapes. Unlike text messages, there is no length restriction other than the space remaining on the tape you have loaded. Voice messages can be played back on any terminal of the same type. They cannot be played on standard cassette players or dictating machines.

To record a voice message, press the RECORD VOICE MESSAGE soft key. Your terminal will position the formatted tape for recording. The soft keys change to:

START RECORDING VOICE MESSAGE

When you are clear in your own mind what message you wish to record, pick up the handset, press the START RECORDING VOICE MESSAGE soft key and speak your message. While you are recording, the soft keys will be:

SAVE VOICE MESSAGE	ABORT TAPE OPERATION

The display shows the time and date the message is being recorded along with the elapsed time of the message as it is being recorded.

When you have completed recording your message, press the SAVE VOICE MESSAGE soft key and replace the handset. The soft keys change to the FORMATTED TAPE OPERATIONS soft keys.

7.3.3 Recording Phone Conversations on a Formatted Tape

To record a phone conversation in progress when you have a formatted tape loaded, press the BACK key to display the HOME soft keys. Then press the MESSAGE soft key followed by the FORMATTED TAPE OPERATIONS soft key. Next, press the RECORD VOICE MESSAGE soft key. After your terminal positions the tape, you are ready to start recording by pressing the START RECORDING VOICE MESSAGE soft key. To stop recording, press the SAVE VOICE MESSAGE soft key.

7.3.4 Recording Text Messages on a Formatted Tape

Text stored in either the message memory or the display memory can be recorded on a formatted tape. Text in the display memory must be copied in the message memory before it can be transferred to tape. See sections 6.3.3 and 10.2.3 for details. For a discussion of the differences between the message memory and the display memory, see section 15.

7.3.5 Unloading a Formatted Tape

To unload a formatted tape, press the MESSAGE soft key in the HOME soft keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the FORMATTED TAPE OPERATIONS soft key. The soft keys change to:

FORMAT TAPE	REVIEW MESSAGES	UNLOAD FORMATTED TAPE	RECORD VOICE MESSAGE

Press the UNLOAD FORMATTED TAPE soft key. If the tape index must be updated, the tape will be rewound and the index will be updated before the tape drive door is opened automatically.

7.3.6 Using Previously Formatted Tapes

To load a previously formatted tape, press the MESSAGE soft key in the HOME soft keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the FORMATTED TAPE OPERATIONS soft key. The soft keys change to:

FORMAT TAPE		LOAD FORMATTED TAPE		EJECT

Press the LOAD FORMATTED TAPE soft key. You will hear the tape drive rewind the tape and the tape index will be read into your terminal's memory. As you make additions to the tape, your terminal will update the index in memory. When you unload the tape, the revised index will be automatically written at the beginning of the tape. While the index is stored in your terminal's memory it is protected from loss due to power failures. After the formatted tape has been loaded, the soft keys change to:

FORMAT TAPE	REVIEW MESSAGES	UNLOAD FORMATTED TAPE	RECORD VOICE MESSAGE

7.3.7 Displaying the Tape Index

To display the tape index from a formatted tape you have loaded, press the REVIEW MESSAGES soft key. The soft keys change to:

REVIEW THIS MESSAGE	DISPLAY ALL ENTRIES	DISPLAY VOICE ENTRIES	DISPLAY TEXT ENTRIES	DISPLAY AUTO ANSWER ENTRIES

The first eight entries in the tape index will be displayed in numerical order.

The display will indicate whether entries are voice or text and show their length in minutes and seconds or lines of text. The display will also show if a message was received automatically over the phone line. When there are many entries, you can display selected groups by pressing the appropriate soft key.

7.3.8 Reviewing Taped Messages

The first message in the index will be underlined. Use the down arrow key on the keyboard to move the underline to the message you wish to review. Press the REVIEW THIS MESSAGE soft key. If the selected message is a voice recording, your terminal will position the tape at the start of the message and play it over the loudspeaker. You can listen to the message privately by picking up the handset. If the message is in text, it will be read from the tape into the display memory* and then displayed. The up and down arrow keys on your keyboard can be used to scroll the message. While the message is being played or displayed the soft keys are:

NEW MESSAGE	PRINT MESSAGE

After reviewing a message, the NEW MESSAGE soft key can be used to return to the tape index display and soft keys. Pressing the ABORT TAPE OPERATION soft key while playing a voice message or reading a text message into the display memory stops the operation.

7.3.9 Manipulating a Reviewed Text Message

To print a text message which you have reviewed, press the PRINT MESSAGE soft key.

If you wish to edit or send a text message which you have reviewed in the display memory and there is nothing in the message memory which you need to save, press the BACK key three times. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the MESSAGE EDITOR soft key. The soft keys change to:

CLEAR	INSERT	DELETE	EDITOR SELECTIONS	MESSAGE SELECTIONS

*The message is read into the display memory rather than the message memory so any information in the message memory is not destroyed. For example, you may be creating a memo in the message memory and wish to review a taped text message. You can do this without erasing the memo you are working on.

Press the MESSAGE SELECTIONS soft key. The soft keys change to:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

Press the COPY FROM MODEM OR PORT soft key. The message you reviewed will be copied from the display memory to the message memory. The message will now exist on the tape, in the display memory and in the message memory. The copy in the message memory can be sent over the phone line with the SEND MESSAGE soft key (See section 10.2.4 for details).

If you wish to do extensive editing to the text message which you copied in message memory, press the BACK key. The soft keys change to:

CLEAR	INSERT	DELETE	EDITOR SELECTIONS	MESSAGE SELECTIONS

You can now edit the message before you print it, send it over the phone line or store it on tape.

To directly copy a text message from tape into the message memory use the procedure in section 6.3.4.

7.3.10 Playing Voice Messages Over the Phone Line

If you wish to play a voice message over the phone line during a call, press the BACK key to display the HOME soft keys. Then follow the operation sequence described in 7.3.8. When you press the REVIEW THIS MESSAGE soft key, the voice message will be played over the phone line.

7.4 PRINTING THE INDEX FOR A FORMATTED TAPE

Whenever a formatted tape is loaded in your terminal you can print a copy of the current index associated with the tape if you have a printer attached to your terminal.

To print the tape index, press MORE SELECTIONS in the HOME soft keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Now press the PRINTER SELECTIONS soft key. The soft keys change to:

PRINT CALENDAR	PRINT PHONE DIRECTORY	PRINT TAPE INDEX

Press the PRINT TAPE INDEX soft key to print the current tape index.

7.5 CLOSING THE TAPE DRIVE DOOR

If the tape drive door is open and power to your terminal is off, do not try to close the door! Plug in your terminal or wait until power is restored. If the display is on, power is present. With power present you should be able to close the tape drive door by gently pressing down on it until you feel it latch.

7.6 RECORDER MAINTENANCE

If you see a message on your terminal display after pressing the READ MESSAGE FROM TAPE soft key which indicates there is a tape read error, you should clean the tape drive. If the error message is still displayed when you try to read a message from the same tape after cleaning the tape drive, the tape you are using is probably worn from over use. A tape which is worn from repeated use will continue to cause tape reading errors and should be replaced with a high-quality certified tape.

7.6.1 Cleaning

The tape heads and tape handling parts of the tape drive in your terminal must be cleaned at regular intervals. To assure quality performance at all times, cleaning should be done after every ten hours of tape recording and playback.

Audio and electronics stores, such as Radio Shack, carry a variety of tape head cleaning kits suitable for this purpose.

7.6.2 Demagnetizing

To maximize performance, it is desirable to demagnetize the tape heads when you clean them. Head demagnetizers of various types are available from most audio and electronics stores.

8 AUTOMATICALLY SENDING A MESSAGE

8.1 OPERATION

Seven text or voice messages can each be automatically sent to as many as seven different phone numbers at specified times. To set up this message sending feature, press the MESSAGE soft key in the HOME keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Pressing the AUTOMATIC MESSAGE SEND soft key will change the soft keys to:

DISPLAY THE ENTRY	ADD NEW ENTRY	EDIT THE ENTRY	DELETE THE ENTRY

You have a choice of sending text stored in the message memory or sending a voice or text message stored on a formatted tape. Press the ADD NEW ENTRY soft key. The soft keys change to:

SEND MESSAGE FROM TAPE	SEND MESSAGE FROM MEMORY	RECORD VOICE MESSAGE	REVIEW MESSAGES	ENTER PHONE NUMBERS

8.2 SENDING A MESSAGE FROM THE MESSAGE MEMORY

The label for the SEND MESSAGE FROM MEMORY soft key will be underlined after you press the ADD NEW ENTRY soft key. Unless you press one of the other soft keys, the message to be sent automatically will be the one displayed when you press the MESSAGE EDITOR soft key.

8.2.1 Entering a Time and Date

The display will prompt you to enter the time and date or day of the week to send the message. If you specify a date, the day of the week is determined automatically. If you enter a day rather than a date, the message will be sent the next time that day occurs. If you enter the current day rather than a date and the time entered has not yet passed, the message will be sent today.

Enter the time, the time and date or a time and day of the week when the message is to be sent. The examples displayed in the prompts show the current time, date and day of the week. The current date will already be entered. Enter a different day or date if desired.

8.2.2 Entering Phone Numbers

Next, press the ENTER PHONE NUMBERS soft key or the RETURN key on the keyboard. The display will change so you can enter phone numbers which should receive the message. The soft keys change to:

CLEAR	INSERT	DELETE	SAVE

Up to seven phone numbers, quick access numbers, or directory names can be entered. Single digit numbers are interpreted as quick access numbers. Each phone number, quick access number and name must be entered on a separate line.

Names and quick access numbers are checked by your terminal to make sure a corresponding directory entry exists. If not, you will hear a beep and see an error message. The arrow keys on the keyboard can be used to move the cursor to correct errors.

8.2.3 Saving the Entry

When all the information for sending the message has been entered, press the SAVE soft key. The information will be stored and the automatic message sending function will be activated when the time and date you specified occurs. When you press the SAVE soft key, the soft keys will change to:

DISPLAY THE ENTRY	ADD NEW ENTRY	EDIT THE ENTRY	DELETE THE ENTRY

8.3 SENDING TEXT OR VOICE MESSAGES FROM A FORMATTED TAPE

To send a message stored on a formatted tape loaded in your terminal, press the SEND MESSAGE FROM TAPE soft key. You will be prompted to enter a message number in addition to the time and date or day the message is to be sent. You can display the tape index and review messages before entering a message number by pressing the REVIEW MESSAGES soft key. After checking the tape index or reviewing a message, press the BACK key until the automatic message send format is displayed again.

After you enter the message number, press the ENTER PHONE NUMBERS soft key or the RETURN key on the keyboard. Your terminal will check to make sure a message with the number specified exists. If no message with the number entered exists, you will hear a beep and see an error message. When a valid message number is entered, the display will show the message number and the time, day and date when it is to be sent.

As in sending a message from the message memory, you will see a prompt to enter names, quick access numbers or phone numbers to which the message is to be sent. After doing this, press the SAVE key.

8.4 CHECKING MESSAGE STATUS

Pressing the AUTOMATIC MESSAGE SEND soft key will display the current status of each message which is to be sent automatically. The time and date each message is to be sent will be displayed along with the message type and number. The current status of each message will also be displayed. For example, "2 PENDING, 1 FAILED, 4 SENT" would mean that two locations were still to be called, one location answered but failed to respond properly and the message was successfully sent to four locations.

The first message listed is underlined. The soft keys displayed are:

DISPLAY THE ENTRY	ADD NEW ENTRY	EDIT THE ENTRY	DELETE THE ENTRY

8.4.1 Displaying the Entry

The status for each phone location to which a particular message is to be sent can be displayed. Use the down arrow key on the keyboard to move the underline from the first entry to the message you desire and then press the DISPLAY THE ENTRY soft key.

After pressing the DISPLAY THE ENTRY soft key, the status of each phone location to receive the message will be displayed. The soft keys will change to:

REPLACE THE ENTRY	EDIT THE ENTRY	DELETE THE ENTRY

8.5 ADDING A NEW MESSAGE

If there are less than seven messages listed and you wish to add a new message to be sent automatically, press the ADD NEW ENTRY soft key. The display will prompt you to enter the time the message is to be sent, the phone locations which are to receive the message and the number of the message which is to be sent.

8.6 DELETING OR REPLACING A MESSAGE ENTRY

If there are seven messages listed when you press the AUTOMATIC MESSAGE SEND soft key and you want to add a new message to be sent automatically, you must either delete or replace an entry. If you know which entry you wish to delete, use the down arrow key on the keyboard to move the underline from the first entry to the one to be deleted. Press the DELETE THE ENTRY soft key. Any pending calls for the message entry selected will be canceled and the entry will be removed from the display. You can now add a new message.

If you wish to display the status for each phone location to which a message will be sent before replacing it, press the DISPLAY THE ENTRY soft key. After checking the status for each phone number, you can press the REPLACE THE ENTRY soft key to remove the entry from the automatic message send index and display the prompts for adding a new entry.

8.7 CHANGING A MESSAGE ENTRY

A message entry can be changed by pressing the EDIT THE ENTRY soft key. Pressing the EDIT THE ENTRY soft key allows you to change the time the message is to be sent, change which message is to be sent and change, add or delete phone locations which are to receive the message.

8.8 CREATING A NEW VOICE MESSAGE

To create a new voice message for automatic transmission, press the RECORD VOICE MESSAGE soft key. Your terminal will check for a loaded, formatted tape and position it for recording a new message. The soft keys change to:

START RECORDING
VOICE MESSAGE

When you are clear in your own mind what message you wish to record, pick up the handset, press the START RECORDING VOICE MESSAGE soft key and speak you message. While you are recording, the soft keys will be:

SAVE VOICE MESSAGE	ABORT TAPE OPERATION

The display shows the time and date the message is being recorded along with the elapsed time of the message as it is being recorded.

When you have completed recording your message, press the SAVE VOICE MESSAGE soft key and replace the handset. The display changes to the automatic message send format and requests that you enter the time and date or day the message is to be sent. The SEND MESSAGE FROM TAPE soft key label will be underlined and the prompt "Enter message number" followed by the number of the message you have just recorded will appear. After you enter the information requested, press the ENTER PHONE NUMBERS soft key or the RETURN key on the keyboard. The display will request that you enter names, quick access numbers or phone numbers to which the message is to be sent. Make these entries and then press the SAVE soft key.

The ABORT TAPE OPERATION soft key can be used to cancel the voice message recording operation at any time. After pressing the ABORT TAPE OPERATION soft key, the display shows the automatic message send information format and soft keys.

8.9 HOW A MESSAGE IS SENT

When the time and date to send a message occurs, your terminal will start dialing the numbers you have entered. Each phone number is dialed in order. If a number is busy or not answered after ten rings, it is redialed in ten minutes. If the time to send a message occurs while you are using the phone, your terminal will wait until the phone call is complete before starting the message sending operation.

While the message sending operation is in progress, the current status of each phone number is displayed. The status of the phone number being called is shown as "IN PROGRESS". The soft keys shown are:

ABORT AUTOMATIC
MESSAGE SEND

8.9.1 Priority

Messages can be sent automatically only if the phone line is available. If the phone is being used or is ringing at the time to send a message, automatic message sending will be postponed until the phone stops ringing or is no longer in use. If you are using your terminal for some other purpose when the time to send an automatic message arrives, you will hear a beep twice every fifteen seconds for two minutes. As soon as the prompt line on the display is available, you will see a message indicating that an automatic message is waiting to be sent. If you do not press any keys for two minutes and the phone line is available, your terminal will start the automatic message send operation. To initiate automatic message sending before the two minutes is up, press the BACK key until the time is displayed.

8.9.2 Stopping Automatic Message Send

The ABORT AUTOMATIC MESSAGE SEND soft key can be used to stop the call in progress and to cancel all pending calls related to the message you wish to abort. These phone numbers are then displayed with a status of "ABORTED".

8.9.3 Delivered Messages

When an automatic call is answered, your terminal transmits a series of beeps to warn the person receiving the call that an automatic call is in progress. Your message is then transmitted and your terminal hangs up.

An automatic text call by your terminal could be answered in text mode, voice mode or in automatic answer mode. If your terminal detects an answered carrier tone, it will send the text message. After sending the text message, your terminal will send a signal to notify the answering terminal that the message is complete and it can hang up.

When either a voice or text message is successfully transmitted, the status of the number called is displayed as "SENT". The time that the message was sent will also be displayed.

8.9.4 Undelivered Messages

A status of "FAILED" is displayed when your terminal is unable to deliver a message. There are a number of possible causes for such a failure. If the tape drive mechanism needs cleaning or the tape being used is worn, your terminal may not be able to position the tape to read the message to be sent. Also, if the call is answered in the wrong mode to receive the type of message to be sent, voice or text, your terminal will hang up and retry the call in ten minutes. If the same thing occurs on the second call, the status displayed for that phone number will be changed to "FAILED" and the call will not be repeated.

If the message to be sent is a text message and the call is answered in voice mode, the called party will hear a series of beeps followed by a steady tone. If the called terminal doesn't respond with answered carrier tone within fifteen seconds, your terminal will hang up. Conversely, if the message to be sent is a voice message and the caller answers in text mode with an answered carrier tone, your terminal will send a text message telling the answering terminal to change to voice mode. If the answering terminal doesn't change to voice mode within fifteen seconds, your terminal will hang up. When a modem connection is not made, a second call is attempted before the status is changed to "FAILED".

If your terminal cannot detect dial tone when it starts an automatic message send, it will hang up and display "PENDING" as the status for the phone number it was going to dial. If it fails to detect dial tone on a second attempt to call the same number, the status will be changed to "FAILED".

A status of "FAILED" also results for text messages if a modem connection is lost during a call. This can happen in several ways. First, if a terminal of the same type as yours is being called and it is set up for automatic answer and print messages but the printer runs out of paper or goes off line. If this happens the called terminal will hang up. Your terminal will detect that the carrier tone has been lost and will display a status of "FAILED".

Other ways in which a modem connection can be lost are when the answering terminal sends an XOFF signal and doesn't send the XON signal within the following thirty seconds or when a terminal of the same type as yours is automatically answering your call with RS-232 and the serial port link is broken during the call. Unlike the case where a modem connection is not made and a second automatic call is attempted, a lost modem connection immediately results in a status of "FAILED".

When a voice or text message is sent from a formatted tape, you cannot unload the tape until none of the phone numbers to be sent the message has a "PENDING" status or until automatic message sending is canceled by pressing either the REPLACE THE ENTRY or DELETE THE ENTRY soft keys.

9 AUTOMATIC ANSWER

9.1 OPERATION

The automatic answer feature allows your terminal to answer calls and record either voice or text messages on a formatted tape. Text messages can also be printed if a printer is attached to your terminal. If you do not wish to record messages but would like to give a message to callers, your terminal can automatically answer and give a pre-recorded voice message.

Your terminal can also act as a dial-up modem by automatically answering calls, activating the built-in modem and transferring data between the modem and the RS-232 serial port.

These automatic answer features are available when the phone line is not being used to transmit or receive information and when you are not using your terminal's RS-232 serial port to access a computer (see section 12).

To use the automatic answer features, press the MESSAGE soft key in the HOME keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMATTED TAPE OPERATIONS

Press the AUTOMATIC ANSWER soft key. The soft keys change to:

PRINT MESSAGES	RECORD MESSAGES	ANSWER WITH MODEM RS-232	ANSWER WITH VOICE MESSAGE	REVIEW MESSAGES

A message is displayed indicating if automatic answer is off.

To turn automatic answer on, press one of the above soft keys. When one of the soft key labels is underlined, automatic answer is on. To turn automatic answer off, press the soft key which has an underlined label. The underline will be removed and the display will indicate that automatic answer is off. The RECORD MESSAGES and PRINT MESSAGES automatic answer options cannot be on at the same time, however, if RECORD MESSAGES is on and your printer is also on, incoming text messages will be recorded on tape and printed. Turning on any options will automatically turn off any other option that is on.

9.2 PRINTING MESSAGES

When the PRINT MESSAGES soft key label is underlined, all text messages are printed. Voice messages are ignored by the PRINT MESSAGES option.

With PRINT MESSAGES on, your terminal will answer incoming calls after three rings, however, no voice prompt is given. Rather, the text mode of your terminal is switched on immediately and the caller hears the modem answered carrier tone. Any incoming text message is then sent to the printer. There is no maximum length limit for text messages with the PRINT MESSAGES option on.

When you turn the PRINT MESSAGES option on, your terminal checks to make sure a printer is connected to the parallel printer port and the printer is on line and not out of paper. If any of these conditions are not met, you will hear a beep and see an error message telling you about the problem. If your printer runs out of paper or goes off line during an automatically answered call, your terminal will hang up. Calls will not be automatically answered until the printer is reloaded with paper or put back on line.

9.3 RECORDING MESSAGES ON A FORMATTED TAPE

With RECORD MESSAGES on and a formatted tape loaded, your terminal will automatically answer calls after three rings and record voice and text messages. If the tape runs out while a voice call is being recorded, RECORD MESSAGES will be turned off, your terminal will disconnect from the phone line and no further calls will be answered. Also, your terminal will not answer calls if there is not enough tape available to record a fifty-six line text message.

When a call is answered automatically, your terminal gives the voice message, "This is (your phone number), if you want to leave a recorded message, you may start now". This synthesized voice prompt is followed by a 1.5 second beep.

When RECORD MESSAGES is on, your terminal determines whether an incoming call is a voice call or a text call. The beep given after the synthesized voice prompt is actually the modem answered carrier tone. While sending the beep tone, your terminal is looking for the caller to respond with an originate carrier tone. If the call is a text call and the caller responds with an originate carrier tone, your terminal will remain in modem operation and can record a text message. If no originate carrier tone is detected, your terminal switches to voice mode and can record a voice message. The duration of the beep tone is compatible with the timing of Bell 103J type modems.

The maximum length for each incoming text message is equal to the length of the display memory, which is fifty-six lines with eighty characters per line. Your terminal will automatically hang up after receiving a fifty-six line message unless you have an auxiliary printer on-line. If a printer is on-line, text beyond fifty-six lines will be printed. The first fifty-six lines will be stored on tape.

The maximum length of each incoming voice message is two minutes.

For voice calls, the caller should wait until after the beep tone and then leave a message. Your terminal will automatically hang up after it detects the caller has hung up as indicated by dial tone, a line dead signal or more than ten seconds of silence.

During a text message call, the calling modem will be looking for an answered carrier tone. When it detects the beep tone, it will respond with an originate carrier tone. The text message will then be transmitted to your terminal. When the calling terminal removes the originate carrier tone for more than three seconds, your terminal will automatically hang up.

9.3.1 Entering Your Phone Number

The phone number given in the voice prompt is a number stored in your terminal's memory as MY PHONE NUMBER. Before using RECORD MESSAGES, this number should be changed if it is not the desired number. To do this, press the MORE SELECTIONS soft key in the HOME soft keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press the PHONE SELECTIONS soft key. The soft keys change to:

CHANGE RINGER	CHANGE NORMAL PHONE MODE	CHANGE MY PHONE NUMBER		SYSTEM REVISION

Press the CHANGE MY PHONE NUMBER soft key. Your terminal will display the current entry and prompt you to enter your phone number. The number you enter will be used in the voice prompt message. After entering your phone number, press the SAVE soft key or the RETURN key on the keyboard. Press the BACK key twice to return to the HOME soft keys.

9.3.2 Reviewing Automatically Recorded Messages

When the RECORD MESSAGES feature is being used, your terminal will keep a record of the length and type of each message recorded automatically. This information, along with the message number, can be displayed by pressing the MESSAGES soft key in the HOME keys. The soft keys change to:

MESSAGE EDITOR	AUTOMATIC ANSWER	AUTOMATIC MESSAGE SEND	VOICE TAPE RECORDER	FORMAT TAPE

Press the AUTOMATIC ANSWER soft key. The soft keys change to:

PRINT MESSAGES	RECORD MESSAGES	ANSWER WITH MODEM RS-232	ANSWER WITH VOICE MESSAGE	REVIEW MESSAGES

Press the REVIEW MESSAGES soft key. A numerical listing of new automatically answered messages will be displayed along with their type and length. The soft keys change to:

REVIEW THIS MESSAGE	DISPLAY ALL ENTRIES	DISPLAY VOICE ENTRIES	DISPLAY TEXT ENTRIES	DISPLAY AUTO ANSWER ENTRIES

The messages displayed will be those received since you last initiated message recording by pressing the RECORD MESSAGES soft key. Press the up arrow key on the keyboard or the DISPLAY AUTO ANSWER ENTRIES soft key if you wish to display earlier messages received automatically. By pressing the REVIEW MESSAGES soft key after you turn automatic answer on, you can check the display at any time to see if new messages have been received.

The first message listing will be underlined. Use the down arrow key on the keyboard to move the underline to the message you wish to review. Press the REVIEW THIS MESSAGE soft key or the RETURN key on the keyboard.

If the message is a voice message, your terminal will position the tape at the start of the message and play it over the loudspeaker. You can listen to the message privately by using the handset. If the message is in text, it is read from the tape into the display memory and then displayed. The up and down arrow keys can be used to scroll the message. While the text message is being displayed, the soft keys are:

NEW MESSAGE	PRINT MESSAGE

After reviewing a message, the NEW MESSAGE soft key can be used to return to the tape index display and soft keys. Pressing the ABORT TAPE OPERATION key while playing a voice message or reading a text message into the display memory stops the operation.

To print a text message which you have received, press the PRINT MESSAGE soft key.

Also see Manipulating a Reviewed Text Message (7.3.9) and Playing Voice Messages Over the Phone Line (7.3.10).

9.4 ANSWERING WITH A VOICE MESSAGE

If you are going to be away from your terminal and would like to give a specific voice message to callers, you can set your terminal to automatically answer calls and play a pre-recorded message. To do this, press the ANSWER WITH VOICE MESSAGE soft key. Pressing this soft key turns off all other automatic answer options. After pressing the ANSWER WITH VOICE MESSAGE soft key, the display will show an index of all voice messages stored on the tape. The first entry will be underlined. The soft keys change to:

ANSWER WITH THIS MESSAGE

RECORD NEW VOICE MESSAGE

If the message you wish to play already exists on the formatted tape you have loaded, use the down arrow key on the keyboard to move the underline to the entry you wish to play. Press the ANSWER WITH THIS MESSAGE soft key.

To avoid re-recording your voice messages, you may find it desirable to pre-record a number of messages on the same formatted tape. These messages can then be used for automatic answering in different circumstances. See section 7.3.2 for details.

To record a new voice message, press the RECORD NEW VOICE MESSAGE soft key. Your terminal will position the tape for recording a new message. The soft keys change to:

START RECORDING VOICE MESSAGE

When you are clear in your own mind what message you wish to record, pick up the handset, press the START RECORDING VOICE MESSAGE soft key and speak your message. While you are recording, the soft keys will be:

SAVE VOICE MESSAGE

ABORT TAPE OPERATION

The display shows the time and date the message is being recorded along with the elapsed time of the message as it is being recorded.

When you have completed recording your message, press the SAVE VOICE MESSAGE soft key and replace the handset. The display will show that calls will be answered with a voice message and indicate the message number.

9.5 ANSWERING WITH MODEM-RS232

When your terminal's RS-232 serial port is connected to an in-house computer, incoming calls can be automatically connected to the computer. This dial-up access is set up by pressing the ANSWER WITH MODEM-RS232 soft key. Pressing this soft key turns all other automatic answer options off.

When the ANSWER WITH MODEM-RS232 option is on, your terminal answers incoming calls after one ring. It immediately switches to modem operation and puts on the answered carrier tone. Any data received over the modem is retransmitted over the RS-232 serial port. Likewise, data received over the RS-232 serial port is retransmitted over the modem. Overrun and data rate problems are covered in section 12.10.

10 TEXT COMMUNICATION

10.1 OPERATION

The text sending and receiving capabilities of your terminal are useful when communicating with another terminal of the same type or any ASCII terminal or computer which uses a 300 baud modem. Text communication consists of communicating with another person or a computer network by sending information typed on your terminal's keyboard over the phone line. Unlike text messages, which are precomposed, text communication is usually conversational like a voice phone call. A text communication call begins just like a normal phone call. The call is then switched to text communication by manually changing the call mode or by your terminal automatically changing the call mode. A text communication call often begins with a voice conversation and then is switched to text communication to send information which is not suitable for verbal transmission or information which you have stored in the message memory.

You should read the following section completely before making your first text communication call.

10.1.1 Making a Text Communication Call

If you wish to send text information during a voice call, both parties must switch to an ASCII* mode. To do this, press the CHANGE CALL MODE soft key. This is one of the soft keys you will see when talking on the phone. If the display shows the HOME keys, press the PHONE KEYS soft key to reach the CHANGE CALL MODE soft key.

The soft keys will change to:

VOICE	ASCII ANSWER MODE	ASCII ORIGINATE MODE	MODEM SELECTIONS

You must decide on who is to select ANSWER MODE and who is to select ORIGINATE MODE. An easy rule to use is for the caller to select ORIGINATE and the answerer to select ANSWER. Once they are selected, these modes can be used throughout a call. The soft key label for the mode selected will be underlined. After changing to ASCII mode, text typed by both parties will appear on your display. While text information is being exchanged you will not be able to use the handset for voice communication. If you are communicating with a terminal of a different type, the message you type may not show on your display. You must change the transmission mode of your terminal to KEY TRANSMIT WITH ECHO. If each character you type is displayed twice, the transmission mode of your terminal must be changed to KEY TRANSMIT WITHOUT ECHO. (See section 10.4.) The normal mode of your terminal is KEY TRANSMIT WITHOUT ECHO.

10.1.2 Correcting an Error in Mode Selection

When you switch to an ASCII mode from the voice mode, if there is no carrier tone present or the wrong carrier tone is selected by either party, the following error message is displayed any time you attempt to transmit text.

Waiting for carrier. Press RETURN or BACK to abort.

*ASCII stands for American Standard Code for Information Interchange

You can check the current ASCII mode of your terminal while you are on the phone. To do this, press the CHANGE CALL MODE soft key.

First, switch to VOICE mode by pressing the VOICE soft key. If you hear a high pitched tone on the loudspeaker or in the handset, the soft key you should press is the ASCII ORIGINATE MODE soft key. If you do not hear a tone, the party you are communicating with is in ASCII ORIGINATE MODE or is still in VOICE mode. Try speaking to the other party. If you don't get a response, you should press the ASCII ANSWER MODE soft key. The correct carrier tones must be present before text can be transmitted.

10.2 TEXT DISPLAY MEMORY

10.2.1 Memory Size

The text you send and receive is stored in the display memory. The memory can hold 56 lines with 80 characters in each line. This is equal to the text on an 8.5 by 11 inch sheet of paper. Thirteen lines of the memory are normally displayed. The text is automatically scrolled as new lines are added at the bottom of the display. When the memory is full, new lines are added at the end of the memory and old lines at the beginning are lost. Twenty-four lines can be displayed if you desire. See section 11.2 for details. A detailed discussion of the display memory can be found in section 15.

10.2.2 Viewing Text in Memory

The up, down, left and right arrow keys can be used to move the cursor within the display memory while a text communication call is in progress. Pressing the up arrow key with the cursor in the top display line causes the displayed text to be scrolled until the first line in the memory is reached. Pressing the down arrow key with the cursor in the bottom display line scrolls the displayed text and inserts blank lines if the display is scrolled past the end of the display memory. When new blank lines are inserted, old lines at the start of the memory are lost. Pressing the SHIFT key along with the up arrow key will move the cursor to the first line in the memory. Pressing the SHIFT key along with the down arrow key will move the cursor to the last line of the memory.

To view the display memory after you hang up, press the COMPUTER TERMINAL soft key in the HOME keys.

10.2.3 Saving Text Messages Electronically

The contents of the display memory used during text communication calls can be duplicated in the message memory used in precomposing text messages. This is useful for temporarily saving or editing messages sent or received over the phone line.

After copying the information from the display memory into the message memory, it can be stored on tape. See section 6.3.3 for details.

To save the last 56 lines in the display memory when you are in the process of making a text call, press the MESSAGE EDITOR soft key displayed in the following soft keys:

HANG UP	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	CHANGE CALL MODE

You may have to press the BACK key one or more times to reach these soft keys.

After pressing the MESSAGE EDITOR soft key, you will see the contents of the message memory on the display. The soft keys change to:

CLEAR	INSERT	DELETE	EDITOR SELECTIONS	MESSAGE SELECTIONS

Press MESSAGE SELECTIONS. The soft keys will change to:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

Press the COPY FROM MODEM OR PORT soft key and the information displayed will be replaced by the last 56 lines of your text communication.

To return to the text communication mode, press the BACK key twice. The soft keys displayed will be:

HANG UP	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	CHANGE CALL MODE

The display will show the 13 lines of your text call which were displayed last and you can continue to communicate.

10.2.4 Sending Stored Text Messages During a Call

When a text communication call is in progress, you can transmit the entire contents of the message memory (used in precomposing text messages) over the phone line. This feature allows a 56 line message which you have pre-composed or which you previously received from another terminal or a computer to be sent any time during the call.

To send a stored message when you are in the process of making a text call, follow the same steps as used in section 10.2.3 until the soft keys shown are:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

Position the cursor at the point in the message where you wish to start transmitting.

Press the SEND MESSAGE soft key. You will see the cursor move through the text of the message as it is being sent. While the message is being sent the soft keys will change to:

STOP
TRANSMIT

When the transmission is completed your terminal will automatically return to the text communication mode.

The SEND MESSAGE soft key will transmit the same message to your in-house computer over the RS-232 port if it is active.

10.3 MANUALLY ANSWERING TEXT CALLS

Text messages can be sent to your terminal over the phone line from any terminal which transmits ASCII at 300 baud. An incoming text message call can be answered manually by you or automatically by your terminal.

You can manually answer a call when your phone rings by either picking up the handset or pressing the ANSWER THE PHONE soft key.

10.3.1 Handset

If you pick up the handset and hear a series of beeps followed by a steady tone or a steady tone alone, this probably indicates that you are receiving a text call. You should press the CHANGE CALL MODE soft key. The following soft keys will be displayed:

VOICE	ASCII ANSWER MODE	ASCII ORIGINATE MODE	MODEM SELECTIONS

Press the ASCII ANSWER MODE soft key. Do not replace the handset in its cradle until after you have pressed one of the ASCII mode soft keys. The incoming text message will be displayed on your terminal. When the message has been received, press the HANG UP soft key.

10.3.2 Answer the Phone Soft Key

If you are expecting an automatically transmitted text communication call from another terminal of the same type, press the ANSWER THE PHONE soft key. Through the loudspeaker on your terminal you will hear a series of beeps followed by a steady tone indicating an incoming text call. Instead of picking up the handset, you should press the CHANGE CALL MODE soft key and then the ASCII ANSWER MODE soft key. The incoming text message will be displayed on your terminal. If you are using your terminal for another operation when the phone rings, press the BACK key until you reach the ANSWER THE PHONE soft key.

If your terminal is normally used for text communication or as a data terminal it can be set up so when you press the ANSWER THE PHONE soft key it will automatically switch to the ASCII ANSWER MODE and send an answered carrier tone. You can still use the handset to answer voice calls. See section 17 for details.

10.4 TEXT TRANSMISSION MODES

Text can be transmitted by your terminal one character at a time while you are typing, a line at a time, or a number of lines at a time. The last two modes allow you to edit text before it is sent.

10.4.1 Key Transmit Modes (single character)

There are two key transmit modes. These modes allow you to send characters as you type them. The KEY TRANSMIT WITHOUT ECHO* mode is the mode you should use for calls between your terminal and another terminal of the same type and most other non-voice calls that you originate. The KEY TRANSMIT WITH ECHO mode is used for calls to computer services that do not echo received characters. In both KEY TRANSMIT modes, your terminal transmits each character as soon as a key is pressed. Your terminal will be automatically reset to KEY TRANSMIT WITHOUT ECHO when you hang up.

10.4.2 Line Transmit Mode

In LINE TRANSMIT mode, characters are displayed on your terminal but not transmitted as keys are pressed. The entire line containing the cursor is transmitted when the RETURN key is pressed. Any mistakes in the line can be corrected before pressing RETURN. Any line can be sent again by using the up and down arrow keys to position the cursor in a line and then pressing RETURN. Received characters are ignored by your terminal while it is transmitting in LINE mode.

10.4.3 Block Transmit Mode

In BLOCK TRANSMIT mode, no characters are transmitted until the TRANSMIT soft key is pressed. The TRANSMIT soft key automatically transmits the contents of the display memory starting at the character underlined by the cursor. Received characters are ignored by your terminal while it is transmitting characters in BLOCK mode. The BLOCK TRANSMIT mode is useful when you want to precompose text longer than one line or edit text you have received before retransmitting it.

10.4.4 Changing Transmit Mode

Press the MODEM SELECTIONS soft key and the soft keys change to:

SEND BREAK	SET PARITY AND WORD LENGTH	CHANGE TRANSMIT MODE

Press the CHANGE TRANSMIT MODE key and the soft keys change to:

KEY TRANSMIT WITH ECHO	KEY TRANSMIT WITHOUT ECHO	LINE TRANSMIT MODE	BLOCK TRANSMIT MODE	USE XON/XOFF

Press the soft key for the mode you want. The mode you select will be underlined.

*The WITH ECHO and WITHOUT ECHO options determine whether the transmitted character is displayed (echoed). If KEY TRANSMIT WITH ECHO is selected, the character is displayed and transmitted. In the KEY TRANSMIT WITHOUT ECHO mode, the character is transmitted and your terminal expects the receiving terminal to transmit it back immediately. Your terminal will display the character only after receiving it. Another name for KEY TRANSMIT WITHOUT ECHO is full duplex. KEY TRANSMIT WITH ECHO is referred to as half duplex.

10.4.5 Transmit Soft Key

While you are making a text communication call, the soft keys normally displayed are:

HANG UP	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	CHANGE CALL MODE

To transmit text while in BLOCK TRANSMIT mode, locate the cursor under the first character to be sent using the arrow keys. Press the TRANSMIT soft key. Your terminal will begin sending characters from the display memory. When the end of the memory is reached or the rest of the memory is blank, transmission stops. While transmitting, the soft keys are labeled:

STOP
TRANSMIT

A transmission can be stopped at any time by pressing the STOP TRANSMIT soft key or the BACK key.

10.4.6 USE XON/XOFF Soft Key

The USE XON/XOFF soft key is normally underlined to indicate the XON/XOFF function is enabled. This function prevents data from being lost by having your terminal automatically transmit or receive signals which temporarily interrupt the flow of data until information already received is processed.

Further information related to the XON/XOFF function can be found in sections 12.7.5 and 12.9.

10.5 CONFIGURING THE MODEM

The character length and parity of data sent and received over the phone line can be changed during a call if necessary. To do this, press the MODEM SELECTIONS soft key. The soft keys will change to:

SEND BREAK	SET PARITY AND WORD LENGTH	CHANGE TRANSMIT MODE

Press the SET PARITY AND WORD LENGTH soft key. The soft keys change to:

NO PARITY	ODD PARITY	EVEN PARITY	7 BITS PER CHARACTER	8 BITS PER CHARACTER

Any changes to the modem configuration are only for the call in progress. When you hang up, your terminal modem will be automatically set at 8 BITS PER CHARACTER and NO PARITY. This is done so your terminal can receive text calls from another terminal of the same type as yours.

Since the MODEM SELECTIONS soft key can only be displayed by pressing the CHANGE CALL MODE soft key which appears after a phone call is initiated, you can only change character length and parity after you hear dial tone. Changes can be made before you dial, while dialing is taking place, or during a call.

10.5.1 Character Length

Either 7 BITS PER CHARACTER or 8 BITS PER CHARACTER will be underlined. Press the soft key for the length desired if it is not already underlined. The underline will move to the new selection. The character length selected must match that used by the computer you are communicating with to avoid data framing errors. Framing errors are indicated on your display by the symbol F_E. If the symbol F_E appears repeatedly, you may be using the wrong character length or you may have a bad connection.

10.5.2 Parity

Parity is used to detect errors in the transmission of data. One of the three parity labels will be underlined. To change the parity, press the soft key corresponding to the desired mode. The underline will move to the new selection. If NO PARITY is selected, your terminal will not generate parity in transmitted data and will not detect parity errors in received data. If ODD PARITY is selected, your terminal will generate odd parity in transmitted data and will expect odd parity in received data. Likewise, if you select EVEN PARITY your terminal will generate even parity in transmitted data and will expect even parity in received data. Incorrect parity in received data will result in parity errors. The parity bit generated for transmitted data is in addition to the character length selected. Incorrect parity can be indicated on your display by the symbol F_E if NO PARITY is underlined. If the symbol P_E is displayed repeatedly, you may be using the wrong parity. After selecting parity, press the BACK key to return to the CONFIGURE MODEM soft keys.

10.6 PRINTING TEXT COMMUNICATION

If an external printer is connected to your terminal, the PRINT DISPLAY MEMORY soft key can be used to create a paper copy of the fifty-six lines of text communication which are stored in the display memory of your terminal.

To make a paper copy, use the arrow keys to locate the cursor under the first character to be printed. Press PRINT DISPLAY MEMORY to print the display memory starting at the cursor position. Blanks at the end of a line are not sent to the printer. Printing stops when the end of the memory is reached or the rest of the memory is blank. While printing, the soft keys are labeled:

STOP
PRINT

Printing can be stopped at any time by pressing the STOP PRINT soft key or the BACK key.

11.1 CALLING REMOTE COMPUTERS OR DATABASES OVER THE PHONE LINE*

One application of your terminal is accessing remote computers and time sharing networks. To do this, dial the phone number of the computer or network. After dialing, the soft key labels will be:

HANG UP	HOLD	REDIAL	HOOK FLASH	CHANGE CALL MODE

You can monitor the progress of the call on the loudspeaker or handset. When the computer or data service answers, you will hear a high pitched tone. This tone indicates you have reached the computer or data service. Press the CHANGE CALL MODE soft key. The soft keys change to:

VOICE	ASCII ANSWER MODE	ASCII ORIGINATE MODE		MODEM SELECTIONS

Press the soft key labeled ASCII ORIGINATE MODE. This answers the computer and clears the display. ASCII ORIGINATE MODE is now underlined.

You can type commands to the remote computer on the keyboard. The commands and any response from the computer will appear on the display.

When the BACK key is pressed, instead of displaying the normal phone soft keys, the following soft keys are displayed:

HANG UP	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	CHANGE CALL MODE

When you are finished, press the HANG UP soft key.

If you have a printer and it is on line, all commands and responses will be printed.

If your terminal is normally used in an ASCII mode, it can be set up to automatically detect an answered carrier tone and automatically respond with an originate carrier tone when you make a call using the DIAL THE NUMBER soft key or by any other method except lifting the handset and dialing the number as with a conventional telephone. See section 17 for details.

Databases often require that you transmit certain ASCII control codes in order to communicate with them. To transmit control codes with your terminal, you must press one of the letter or symbol keys on the keyboard while holding down the CTRL key. A list of ASCII control codes can be found in section 12.12.

*This terminal has a built-in 300 baud modem. The modem is used to send and receive ASCII data. The modem is interfaced directly to the phone so there is no need for an acoustic coupler.

11.2 24 LINE MODEM DISPLAY

Your terminal display will normally show thirteen lines of text over the soft key labels. If desired, you can change to a twenty-four line display. To do this for calls made over the modem, press the MORE SELECTIONS key in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press CONFIGURATION SELECTIONS. The soft keys change to:

16 LINE MODEM DISPLAY	24 LINE MODEM DISPLAY	16 LINE SERIAL PORT DISPLAY	24 LINE SERIAL PORT DISPLAY	SET DATE AND TIME

Press the 24 LINE MODEM DISPLAY soft key. The underline will move from 16 LINE MODEM DISPLAY to 24 LINE MODEM DISPLAY.

Now when you make a text communication call or call remote computers or databases over the phone line, no soft key labels will be displayed when you press either the ASCII ANSWER MODE or ASCII ORIGINATE MODE soft keys. Without the soft key labels your display can show twenty-four lines of text.

If you wish to display the soft key labels while operating your terminal in the twenty-four line mode, press the BACK key. You will see twenty-one lines of text and whatever soft keys were displayed last.

To blank the soft keys and return to twenty-four lines of text, press the SHIFT key on the keyboard and the BACK key at the same time.

11.3 SEND BREAK SOFT KEY

Many databases and computers which are accessed over the phone line require the caller to transmit a "break" signal for purposes such as ending a call. To do this with your terminal, press the CONFIGURE MODEM soft key. The soft keys change to:

SEND BREAK	SET PARITY AND WORD LENGTH	CHANGE TRANSMIT MODE

Pressing the SEND BREAK soft key will force the modem to its spacing state for .25 seconds. If a longer "break" is required, holding down the SHIFT key on the keyboard while pressing the SEND BREAK soft key will increase the time to 3.5 seconds.

12 COMPUTER TERMINAL

12.1 DIRECT ATTACHMENT TO COMPUTERS

You can use the RS-232 serial port on your terminal to interface with an in-house computer. A standard RS-232 connector is provided on the rear panel of your terminal. The connector is labeled "SERIAL PORT". Soft key selectable baud rates from 110 to 9600 baud are available. Data are transmitted and received over the RS-232 serial port using ASCII.

12.2 USING THE RS-232 SERIAL PORT

To activate the RS-232 serial port, press the COMPUTER TERMINAL soft key in the HOME keys. The soft keys change to:

CONNECT TO MODEM	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	SERIAL PORT SELECTIONS

To disconnect the RS-232 serial port, press the BACK key and return to the HOME keys.

The ASCII data sent and received over the RS-232 serial port is stored in the display memory of your terminal. The displayed information is scrolled as new lines are added at the bottom of the display. When the display memory is full (56 lines of 80 characters), new lines are added at the end of the memory and old lines at the beginning are lost.

The up, down, left and right arrow keys can be used to move the cursor within the display memory. New text will always be added at the cursor position. Any text already at that position will be overwritten by new text. Pressing the up arrow key with the cursor in the top line of the display causes the displayed area to be scrolled. Pressing the down arrow key with the cursor in the bottom line of the display scrolls the displayed area and inserts new blank lines at the last line of the display if the display is scrolled past the end of the display memory. If new blank lines are inserted, old lines at the beginning of the memory are lost. If you press the SHIFT key along with the up arrow key the cursor will move to the first line in the memory. Pressing the SHIFT key with the down arrow key will move the cursor to the last line of the memory.

Activating the RS-232 serial port does not clear the display memory. Data sent and received previously will still be displayed.

12.3 24 LINE SERIAL PORT DISPLAY

The display will normally show thirteen lines of text over the soft key labels. If desired, you can change to a twenty-four line display. To do this for information transmitted and received over the RS-232 serial port, press the MORE SELECTIONS soft key in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press CONFIGURATION SELECTIONS. The soft keys change to:

16 LINE MODEM DISPLAY	24 LINE MODEM DISPLAY	16 LINE SERIAL PORT DISPLAY	24 LINE SERIAL PORT DISPLAY	SET DATE AND TIME

Press the 24 LINE SERIAL PORT DISPLAY soft key. The underline will move from 16 LINE SERIAL PORT DISPLAY to 24 LINE SERIAL PORT DISPLAY.

Now when you press the COMPUTER TERMINAL soft key in the HOME soft keys, no soft key labels will be displayed. Without the soft key labels your display can show twenty-four lines of text.

If you wish to display the soft key labels while operating your terminal in the twenty-four line mode, press the BACK key. You will see twenty-one lines of text and whatever soft keys were displayed last.

To blank the soft keys and return to twenty-four lines of text, press the SHIFT key on the keyboard and the BACK key at the same time.

If the phone rings while you are in either the sixteen or twenty-four line mode, lift the handset or press the BACK key until you see the following HOME soft keys:

ANSWER THE PHONE	PHONE DIRECTORY	MESSAGE	COMPUTER TERMINAL	MORE SELECTIONS

When the HOME soft keys are displayed you are automatically disconnected from the RS-232 serial port. Press the ANSWER THE PHONE soft key.

If the normal phone mode is ASCII and you press the ANSWER THE PHONE soft key to answer an incoming text communication call, you will be disconnected from the RS-232 serial port and the display will show text information received or sent over the modem.

12.4 SEND BREAK SOFT KEY

To send a "break", press the SERIAL PORT SELECTIONS soft key. The soft keys change to:

SEND BREAK	SET PARITY AND WORD LENGTH	CHANGE BAUD RATE	CHANGE TRANSMIT MODE

Pressing the SEND BREAK soft key causes the transmission line to be forced to its zero state for .25 seconds. If the SHIFT key on the keyboard is down when SEND BREAK is pressed, the time is increased to 3.5 seconds. Data Terminal Ready is not asserted during the break.

12.5 SIMULTANEOUS USE OF PHONE AND RS-232 SERIAL PORT

Voice phone calls can be answered while using the RS-232 serial port without disabling the serial port. To answer a text call you must press the BACK key. This will disconnect the serial port so the display memory can be used for operations such as electronic mail.

12.6 CONFIGURING THE RS-232 SERIAL PORT

The baud rate, parity and character length of data sent and received over the RS-232 port can be configured for the computer used. To change the configuration, press the SERIAL PORT SELECTIONS soft key. The soft keys change to:

SEND BREAK		SET PARITY AND WORD LENGTH	CHANGE BAUD RATE	CHANGE TRANSMIT MODE

Press the SET PARITY AND WORD LENGTH soft key. The soft keys change to:

NO PARITY	ODD PARITY	EVEN PARITY	7 BITS PER CHARACTER	8 BITS PER CHARACTER

12.6.1 Character Length

Either 7 BITS PER CHARACTER or 8 BITS PER CHARACTER will be underlined. Press the soft key for the length desired if it is not already underlined. The underline will move to the new selection. The character length selected must match that used by your in-house computer to avoid data framing errors. Framing errors are indicated on your display by the symbol F_E. If the symbol F_E appears repeatedly, you may be using the wrong character length or you may have a bad connection.

12.6.2 Parity

Parity is used to detect errors in the transmission of data. One of the three labels will be underlined. To change the parity, press the soft key corresponding to the desired mode. The underline will move to the new selection. If NO PARITY is selected, your terminal will not generate parity in transmitted data and will not detect parity errors in received data. If ODD PARITY is selected, your terminal will generate odd parity in transmitted data and will expect odd parity in received data. Likewise, if you select EVEN PARITY your terminal will generate even parity in transmitted data and will expect even parity in received data. Incorrect parity in received data will result in parity errors. The parity bit generated for transmitted data is in addition to the character length selected. Incorrect parity can be indicated on your display by the symbol F_E if NO PARITY is underlined. If the symbol P_E is displayed repeatedly, you may be using the wrong parity. After selecting parity, press the BACK key to return to the SERIAL PORT SELECTIONS soft keys.

12.6.3 Baud Rate

Baud rates from 110 to 9600 baud are available on the RS-232 serial port. To change the baud rate, press the SERIAL PORT SELECTIONS soft key. The soft keys change to:

SEND BREAK		SET PARITY AND WORD LENGTH	CHANGE BAUD RATE	CHANGE TRANSMIT MODE

Press the CHANGE BAUD RATE soft key. The soft keys change to:

9600 BAUD	4800 BAUD	2400 BAUD	1200 BAUD	MORE BAUD RATES

For additional baud rate selections, press the MORE BAUD RATES soft key. The new selections are:

600 BAUD	300 BAUD	150 BAUD	110 BAUD

The baud rate currently in use is underlined. To select a new baud rate, press the soft key for the baud rate desired. The underline will move to the new selection. Press the BACK key to return to the high baud rate selections from the low baud rate selections. Pressing the BACK key with the high baud rate selections displayed returns the soft keys to the SERIAL PORT SELECTIONS soft keys.

After changing the RS-232 configuration, press the BACK key to return to the COMPUTER TERMINAL soft keys.

12.7 RS-232 SERIAL PORT TRANSMIT MODES

Data can be transmitted over the RS-232 serial port one character at a time, a line at a time, or a number of lines at a time. Transmit options can be different for the phone line modem and serial port.

You will recall the SERIAL PORT SELECTIONS soft keys are labeled as follows:

SEND BREAK		SET PARITY AND WORD LENGTH	CHANGE BAUD RATE	CHANGE TRANSMIT MODE

Press the CHANGE TRANSMIT MODE key and the soft keys change to:

KEY TRANSMIT WITH ECHO	KEY TRANSMIT WITHOUT ECHO	LINE TRANSMIT MODE	BLOCK TRANSMIT MODE	USE XON/XOFF

To change the transmit mode, press the soft key for the desired mode. Your terminal uses the underlined transmit mode.

12.7.1 Key Transmit Modes (single character)

In the two KEY TRANSMIT modes, each character is transmitted as soon as a key is pressed. The WITH ECHO and WITHOUT ECHO options determine whether the transmitted character is displayed (echoed). If KEY TRANSMIT WITH ECHO is selected, the character is displayed and transmitted and your terminal expects the receiving computer to transmit it back. If KEY TRANSMIT WITHOUT ECHO is selected, your terminal displays the character only after receiving it from the computer. Another name for KEY TRANSMIT WITHOUT ECHO is full duplex. KEY TRANSMIT WITH ECHO is referred to as half duplex.

12.7.2 Line Transmit Mode

In LINE TRANSMIT mode characters are displayed on your terminal but not transmitted as keys are pressed. The line containing the cursor is transmitted when the RETURN key is pressed. Any mistakes in the line can be corrected before pressing RETURN. Any line can be sent again by using the up and down arrow keys to position the cursor in a line and then pressing RETURN. Received characters are ignored by your terminal while it is transmitting in LINE mode.

12.7.3 Block Transmit Mode

In BLOCK TRANSMIT mode, no characters are transmitted until the TRANSMIT soft key is pressed. The TRANSMIT soft key automatically transmits the contents of the display memory starting at the character underlined by the cursor. Received characters are ignored by your terminal while it is transmitting in BLOCK mode.

12.7.4 Transmit Soft Key

While using the RS-232 serial port, the soft keys displayed are:

```
CONNECT TO        MESSAGE        PRINT DISPLAY       TRANSMIT       SERIAL PORT
  MODEM            EDITOR            MEMORY                         SELECTIONS
```

Locate the cursor under the first character to be sent using the arrow keys. Press TRANSMIT. Your terminal will begin sending characters from the display memory. Trailing blanks in a line are not sent. When the end of the display memory is reached or the rest of the memory is blank, the transmit operation ends automatically. While transmitting, the soft keys are labeled:

```
  STOP
TRANSMIT
```

A transmission can be stopped at any time by pressing the STOP TRANSMIT soft key or the BACK key. The operation of the TRANSMIT soft key is the same in all transmit modes.

12.7.5 USE XON/XOFF Soft Key

Your terminal can operate at maximum transmission rates of 9600 baud over the serial port and 300 baud on the modem. Because incoming data rates may exceed the processing speed of your terminal or the printing speed of your printer, your terminal has the capability to automatically signal transmitting sources to stop sending data until your terminal has processed the incoming information. Incoming characters are stored in a buffer memory for processing by your terminal on a first-in/first-out basis. Your terminal will automatically transmit XOFF (DC3) when the buffer is three-quarters full. A host with the capability of interpreting this signal will then suspend transmission while your terminal continues to process the data stored in the buffer memory. When the buffer is one-quarter full your terminal will transmit XON (DC1) to the host. Upon receiving this signal the host will resume transmission.

Your terminal will also respond to XON or XOFF signals when it is sending data over the modem or the serial port. In most cases you will not be aware this is happening, however, on some occasions after your terminal has received an XOFF signal you will hear a beep and see the message:

Waiting for XON. Press RETURN or BACK to abort.

With XON/XOFF enabled for both the modem and the serial port your terminal will coordinate the flow of data over the modem and through the serial port when either or both are in operation.

The XON/XOFF function of your terminal is always in operation unless you disable it while using either the modem or the serial port. XON/XOFF will be automatically restored for the modem when you hang up the phone. If you have disabled XON/XOFF for the serial port, it must be manually restored by pressing the XON/XOFF soft key under the SERIAL PORT SELECTIONS soft keys. You should only disable XON/XOFF if you determine that a device your terminal is communicating with does not react properly to XON/XOFF control codes.

To disable XON/XOFF for the serial port, press the COMPUTER TERMINAL soft key in the HOME keys. The soft keys change to:

CONNECT TO MODEM	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	SERIAL PORT SELECTIONS

Press the soft key labeled SERIAL PORT SELECTIONS. The soft keys change to:

SEND BREAK		SET PARITY AND WORD LENGTH	CHANGE BAUD RATE	CHANGE TRANSMIT MODE

Press the soft key labeled CHANGE TRANSMIT MODE. The soft keys change to:

KEY TRANSMIT WITH ECHO	KEY TRANSMIT WITHOUT ECHO	LINE TRANSMIT MODE	BLOCK TRANSMIT MODE	USE XON/XOFF

When the USE XON/XOFF soft key label is underlined the XON/XOFF function is enabled. Pressing the XON/XOFF soft key will remove the underline and disable the function. Press the soft key again to restore the function.

12.8 COPYING THE DISPLAY MEMORY CONTENTS

The contents of the display memory can be printed or it can be duplicated in your terminal's message memory.

12.8.1 Printing the Display Memory Contents

With an external printer connected to your terminal, the PRINT DISPLAY MEMORY soft key can be used to create a paper copy of the display memory contents. To make a paper copy, use the arrow keys to position the cursor under the first character to be printed. Press PRINT DISPLAY MEMORY to print the display memory starting at the cursor position. Printing stops when the end of the display memory is reached or the rest of the memory is blank. While printing, the soft keys are:

STOP
PRINT

Printing can be stopped by pressing the STOP PRINT soft key or the BACK key.

12.8.2 Copying in Message Memory

The ASCII data sent and received over the RS-232 serial port is stored fifty-six lines at a time in the display memory of your terminal. These fifty-six lines can be duplicated in message memory if you wish to save them. To do this while in the computer terminal mode, press the MESSAGE EDITOR soft key. You will see the current contents of the message memory and the soft keys will change to:

CLEAR	INSERT	DELETE	EDITOR SELECTIONS	MESSAGE SELECTIONS

Press the MESSAGE SELECTIONS soft key. The soft keys change to:

PRINT MESSAGE	SEND MESSAGE	READ MESSAGE FROM TAPE	WRITE MESSAGE TO TAPE	COPY FROM MODEM OR PORT

Press the COPY FROM MODEM OR PORT soft key. The information displayed will be replaced by the last fifty-six lines of information sent and received over the RS-232 serial port.

To return to operation as a computer terminal, press the BACK key twice. The soft keys change to:

CONNECT TO MODEM	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	SERIAL PORT SELECTIONS

The contents of the display memory, which you just copied in the message memory, will be shown.

12.8.3 Copying on Tape

Once the ASCII data from the display memory has been copied in the message memory it can be recorded on a formatted tape. See section 6.3.3 for details.

12.9 CONNECTING THE RS-232 SERIAL PORT TO THE PHONE LINE MODEM

The RS-232 serial port can be activated while a modem or text communication call is in progress. Data can be sent to and received from your in-house computer without affecting the modem operation. If the CONNECT TO MODEM soft key is pressed, characters typed on the keyboard are sent to both the modem for transmission over the phone line and to your in-house computer. Data received from your in-house computer is retransmitted over the phone line by the modem and data received over the phone line by the modem is retransmitted to your in-house computer. All data sent and received is shown on the display.

12.10 PREVENTING DATA OVERRUNS

Certain conditions must be met by the RS-232 serial port in order to prevent data overruns. Your terminal operates as Data Terminal Equipment (DTE) on the RS-232 serial port. This determines which wire in the RS-232 cable is used for transmitting data and which wire is used for receiving data. The DTE protocol also determines which wires are used to control data transmission. When ready to transmit data, your terminal transmits a Request to Send (RTS) control signal. Your terminal will not transmit data over the serial port unless a Clear to Send (CTS) control signal is transmitted by your in-house computer. If a transmit operation is requested and CTS is not received, you will hear a beep and see the message:

"Waiting for CLEAR TO SEND. Press RETURN or BACK to abort."

Your terminal will clear the error message and perform the transmit operation if CTS is received. You can abort the transmit operation by pressing the BACK key or the RETURN key.

Your terminal uses a Data Terminal Ready (DTR) control signal to indicate when it is ready to receive data. When your terminal is waiting to transmit data to the modem or the printer and cannot receive data without causing an overrun, DTR is not asserted.

If your in-house computer does not use the DTR control signal, the maximum RS-232 baud rate possible without causing data overruns is 600 baud and the maximum baud rate while using CONNECT TO MODEM is 300 baud. This same restriction applies when using automatic answer with the ANSWER WITH MODEM-RS232 option.

12.11 CUSTOM FORMS DISPLAY

Your terminal provides the capability to create forms for input and output of data when used with a computer. In addition, your terminal can be instructed to dial a phone number displayed in a form and the soft keys can be relabeled by the application program running on the computer. Together, these features make your terminal a powerful and unique computer peripheral. See section 18 for detailed information.

12.12 ASCII CONTROL CODES

The following table lists ASCII control codes and the action taken by your terminal when they are received or when they are entered on the keyboard. All ASCII codes can be generated on the keyboard except FS,\ ,{ ,¦ ,} ,~, ‘, and DEL.

Decimal	Symbol	Keyboard	Definition
7	BEL	CTRL-G	Bell. Causes a short beep.
8	BCK	CTRL-H or BACKSPACE	Backspace. Displays a blank, moves the cursor left one space and displays another blank.
10	LF	CTRL-J	Line Feed. Moves the cursor to the next line unless it is immediately preceeded by a carriage return (see CR).
11	VT	CTRL-K	Vertical Tab. Moves the cursor to the next vertical tab line. Vertical tab lines are preset at lines 1, 15, 29 and 43. The tab line is positioned as the top line on the display.
12	FF	CTRL-L	Form Feed. Clears the entire display memory and moves cursor to the first character of the first line.
13	CR	CTRL-M	Carriage Return. Moves the cursor to the start of the next line. If a line feed immediately follows the carriage return, it is ignored since the carriage return already caused a line feed.
27	ESC	CTRL-[	Escape. Starts an escape sequence. The escape sequence ends when all valid characters have been received or when an invalid character is received. Characters within escape sequences are not displayed.
17	XON	CTRL-Q	Transmission On. Signals host to resume transmission of data.
19	XOFF	CTRL-S	Transmission Off. Signals host to suspend transmission of data.

All control codes entered on the keyboard are transmitted when using the RS-232 serial port or the modem. Control codes should be entered only in the key transmit mode.

13 ELECTRONIC CALENDAR

13.1 TIME MANAGEMENT

Two important time management features are an electronic calendar and a reminder alarm. The calendar helps you keep track of meetings and appointments and the alarm can be used to alert you to important events. To use these features, press the MORE SELECTIONS soft key in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press the soft key labeled CALENDAR. The soft keys change to:

PREVIOUS DATE	NEXT DATE	ADD NEW ENTRIES	EDIT THE ENTRY	DELETE THE ENTRY

You will see any calendar entries for the current day and date on the display.

Be sure you have set the correct date and time on your terminal's electronic clock before using the calendar. (See section 2.)

13.2 ADDING CALENDAR ENTRIES

To add entries to your calendar, press the ADD NEW ENTRIES soft key. The soft keys are now labeled:

CLEAR	INSERT	DELETE	CHANGE ALARM	SAVE

These editing soft keys, the arrow keys and the TAB key can be used to make corrections to entries.

The display will prompt you to enter a time, date, or day of the week and the reminder text for the entry.

The time, and either the date or day of the week can be entered or one or more of these can be left out. Which items are entered affects how the entry appears in the calendar.

13.2.1 Time Entries

You can enter the time alone, with the date, or with a day of the week. A time must be entered if the alarm is on. If only the time is entered, the entry is displayed every day. If the time is entered with a date (for example, 10:00 AM MARCH 16), the entry will be displayed only for the date specified. If the time is entered with the day of the week but without a date (for example, 4:00 PM TUESDAY), the entry will be displayed weekly on the day specified.

Use the CHANGE ALARM soft key to specify if you wish to hear an audible alarm when the time occurs. The calendar display shows a bell symbol next to the reminder when the alarm is on.

13.2.2 Date Entries

If you specify a date, the entry will be displayed on that date. The correct day of the week is automatically calculated. The year used to calculate the day of the week is the current year or the next year if the date specified has passed.

13.2.3 Day Entries

You can make an entry with only the day of the week specified. These entries will be displayed every week on the day you enter.

13.2.4 Completing the Entry

Use the keyboard to enter a reminder text up to 60 characters in length.

Press the SAVE soft key or the RETURN key on the keyboard to store the calendar entry.

13.3 SPACE AVAILABLE FOR ENTRIES

The number of calendar entries you can make depends on the length of each entry. A typical entry has 20 characters. The calendar memory is large enough for 40 entries of typical size. The number of entries can also be affected by the size of the phone number directory. See Section 16 for further information.

13.4 REVIEWING CALENDAR ENTRIES

When you press the CALENDAR soft key in the HOME keys, entries for the current date will be displayed. Entries without a time are followed by those with a time. The soft keys displayed are:

PREVIOUS DATE	NEXT DATE	ADD NEW ENTRIES	EDIT THE ENTRY	DELETE THE ENTRY

The display will prompt you to enter another calendar date to see entries for a new date. To do this, enter the new date and press the RETURN key. If all the entries for a date cannot be displayed at once, use the up and down arrow keys for scrolling.

Pressing the NEXT DATE soft key displays entries for the date after the one you see on the display. Pressing the PREVIOUS DATE soft key displays entries for one day prior to the day shown. These keys can be pressed repeatedly to move forward or backward one day at a time. To move immediately to the next date or a previous date which has a dated entry, hold down the SHIFT key on the keyboard while pressing the NEXT DATE or PREVIOUS DATE soft key.

13.5 DELETING ENTRIES

The up and down arrow keys move the underline from entry to entry on the display. Pressing the DELETE THE ENTRY soft key will delete the underlined entry from the calendar. Entries with the date specified are automatically deleted eight days after they come due.

13.6 EDITING ENTRIES

To edit a calendar entry, press the EDIT THE ENTRY soft key. You will see the information for the underlined entry. Move the cursor to the item to be edited with the up and down arrow keys or the TAB key. Press the SAVE soft key to store the edited entry in the calendar.

13.7 ALARM REMINDERS

Calendar entries with the alarm on will cause an audible alarm to sound at the specified time.

The display will show the message "Reminder alarm. Check calendar."

You will hear a double beep every fifteen seconds for two minutes or until you check the calendar by pressing the CALENDAR soft key. After two minutes the alarm will not sound but the displayed message will remain until you press the CALENDAR soft key. If the calendar entry is on the display when the reminder alarm sounds, press the up or down arrow key on the keyboard or the PREVIOUS DATE or NEXT DATE soft keys to acknowledge the reminder.

13.8 PRINTING THE CALENDAR

As an aid in keeping track of calendar entries you can make a paper copy of the entire calendar if your terminal has an external printer attached.

To print your calendar entries, press MORE SELECTIONS in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Now press the PRINTER SELECTIONS soft key. The soft keys change to:

PRINT CALENDAR	PRINT PHONE DIRECTORY	PRINT TAPE INDEX

Press the PRINT CALENDAR soft key to print all your calendar entries on your external printer. Entries will be listed by days of the week with time only entries first, then day only entries. These will be followed by a listing of each day which has a date entry. The time only and day only entries for each date will be repeated.

14.1 CHARACTERISTICS

A parallel printer interface is provided on the rear panel of your terminal for connecting an external printer. Any printer with a standard Centronics parallel interface can be connected. If the printer is to be used for electronic mail and other text information sent over the phone line, it is preferable that the printer selected be able to sustain an average printing rate of 30 characters per second. Printers slower than 30 characters per second can be used if XON/XOFF is enabled. (See sections 10.4.6 and 12.7.5). Also, the printer should be able to print 80 characters per line. Printer interface specifications are shown in section 20.

14.2 OPERATION

Your external printer can be used to produce copies of individual messages you generate with the message editor (using the PRINT MESSAGE soft key), or to print text received over the phone line or RS-232 serial port (using the PRINT DISPLAY MEMORY soft key). In addition, your terminal can be set to print all text received and transmitted over the phone line and RS-232 serial port. To connect a printer to your terminal you must turn on the printer power switch and then connect the printer cable to the printer port on the rear of your terminal. Whenever you want to stop or start printing data, use the on line/off line or select switch on the printer.

If the printer is used during operation of the RS-232 serial port, the data rate will be limited by the speed of the printer. See section 12.10 for a discussion of preventing overruns which applies to the printer as well as computers.

Before starting any printing operation, your terminal checks to make sure the printer is on line. If the printer is not on line, you will hear a beep and see the message:

The printer is not on line.

If you place the printer on line, the message is cleared and the printing operation continues.

If your printer runs out of paper, you will hear a beep and see the message:

Printer is out of paper.

Put paper in the printer to continue the printing operation.

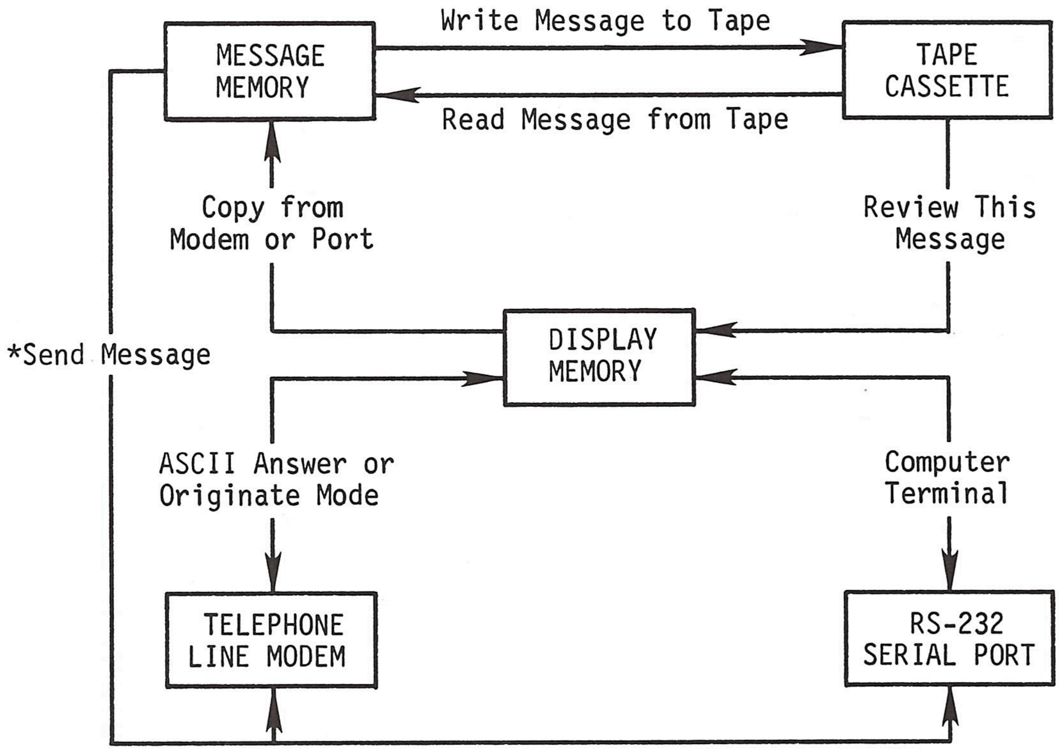
15.1 MESSAGE MEMORY AND DISPLAY MEMORY FEATURES

An understanding of the distinction between the message memory and the display memory is important if you are to use your terminal efficiently.

The message memory is only used for the creation and editing of text messages which are to be stored on tape, printed, or transmitted over the phone line modem or RS-232 serial port at a time of your choosing. The message memory can be thought of as a blank piece of paper which you can write one message on at your leisure and then make a hard copy using a printer or store on a cassette tape for use or further revision at a later time. You can also send a copy to another location over the phone line or to a computer over the RS-232 serial port.

The display memory is used for two functions. First, to display text as it is transmitted and received over the telephone line modem or over the RS-232 serial port and second to review text messages stored on tape. The display memory contents change continually as text information is transmitted and received.

If you wish to save the contents of the display memory on tape, it must first be copied into the message memory. The diagram below illustrates the relationship between the message memory, the display memory and the cassette tape as well as the soft keys which are used to transfer information between them.


MESSAGE MEMORY
Write Message to Tape
TAPE CASSETTE
Read Message from Tape
Copy from Modem or Port
Review This Message
*Send Message
DISPLAY MEMORY
ASCII Answer or Originate Mode
Computer Terminal
TELEPHONE LINE MODEM
RS-232 SERIAL PORT

*See Section 10.2.4 for Procedure

Other differences between the message memory and the display memory include the following.

Editing features: All editing features including clear, insert, delete, tabs and paragraph mode are available when you are viewing the message memory. Only the arrow keys and backspace key can be used when viewing the display memory unless other editing functions are provided by an external computer.

Display format: The message memory is always displayed sixteen lines at a time along with soft key labels. The display memory can be viewed with either sixteen lines or twenty-one lines and soft key labels or twenty-four lines without soft key labels.

Transmission mode: Text transmitted over the telephone line modem or the RS-232 serial port is always sent using the transmission mode set up while using the display memory. Serial port transmission mode selections are accessed using the SERIAL PORT SELECTIONS soft key and telephone line modem transmission selections are accessed using the MODEM SELECTIONS soft key. Whenever the SEND MESSAGES soft key associated with the message memory is pressed, using the procedure given in section 10.2.4, the contents of the message memory are sent over the telephone line modem and/or the RS-232 serial port if they are active.

16 APPENDIX B

16.1 MEMORY USAGE

Directory entries, calendar entries and phone numbers for automatic message sending are stored in a battery backed memory which can hold 4,000 bytes of information. For purposes of illustration each byte can be thought of as one character. A character can be a number, letter, punctuation mark, symbol, or space entered from the keyboard. If each entry consists of a minimum number of characters, a large number of entries can be made in the phone directory and calendar. The maximum number of entries in automatic message send is fixed at seven with each message being sent to a maximum of seven locations.

If a typical directory entry has a ten digit phone number and a fifteen letter name, a typical calendar entry twenty characters, and a typical phone number or directory name for automatic message sending ten characters, then the memory is large enough to contain sixty directory entries, forty calendar entries, and seven entries each with seven phone numbers or directory entries for automatic message sending.

If the size of the individual entries is smaller than typical, more directory or calendar entries can be made. Also, more directory entries can be made if fewer calendar entries are used and vice versa. Memory space is used as new entries are made. Deleting entries makes more space available.

If a new entry is made and no memory space is available, you will hear a beep and see a message indicating the memory is full. An existing entry must be deleted to make space available for the new entry.

The memory space used by each entry can be calculated by the following formulas.

Phone Directory Entry:

6 bytes overhead + Number of characters in name + Number of digits in phone number = Total memory space used

Calendar Entry:

13 bytes overhead + Number of characters in reminder text = Total memory space used

Automatic Message Send Entry:

5 bytes overhead + (6 bytes overhead + Number of characters in phone number or directory entry) = Total memory used

(REPEAT ABOVE CALCULATION FOR EACH PHONE NUMBER AND DIRECTORY ENTRY)

17 APPENDIX C

17.1 ASCII AS NORMAL PHONE MODE

If your terminal is normally used for text communication or as a data terminal, you can reduce the number of soft keys you have to push when placing or answering calls by changing the normal phone mode to ASCII from VOICE.

To change the normal phone mode to ASCII, press MORE SELECTIONS in the HOME keys. The soft keys change to:

CALENDAR	DISPLAY CALL TIMER	PHONE SELECTIONS	PRINTER SELECTIONS	CONFIGURATION SELECTIONS

Press PHONE SELECTIONS. The soft keys change to:

CHANGE RINGER	CHANGE NORMAL PHONE MODE	CHANGE MY PHONE NUMBER	SYSTEM REVISION

Press CHANGE NORMAL PHONE MODE. The soft keys change to:

VOICE	ASCII	ROTARY DIAL	HANDSET	HEADSET

Press the ASCII soft key. The underline will move from VOICE to ASCII. When ASCII is underlined, your terminal will use ASCII as its normal mode when you press the ANSWER THE PHONE soft key. Pressing the VOICE soft key will move the underline back to VOICE and restore the normal mode to VOICE.

17.1.1 Answering Calls

With ASCII as the normal phone mode, your terminal will automatically switch to the ASCII ANSWER MODE when you press the ANSWER THE PHONE soft key. You can still use the handset to answer voice calls.

17.1.2 Making Calls

When making a call to a computer or database with ASCII as the normal phone mode, use the DIAL THE NUMBER soft key or RETURN key to initiate dialing. The soft keys will initially change to the phone keys.

HANG UP	HOLD	REDIAL	HOOK FLASH	CHANGE CALL MODE

If your terminal detects an answered carrier tone when the called party answers, it will automatically respond with an originate carrier tone, switch to ASCII ORIGINATE MODE, and change the soft keys to:

HANG UP	MESSAGE EDITOR	PRINT DISPLAY MEMORY	TRANSMIT	CHANGE CALL MODE

If an answered carrier tone is not detected, your terminal will be in VOICE mode. The handset can be picked up if you desire a voice conversation.

While communicating in ASCII mode, the CHANGE CALL MODE soft key can be used to change the call mode to VOICE. CHANGE CALL MODE only changes the mode of the current call.

18 APPENDIX D

18.1 CUSTOM FORMS DISPLAY

Your terminal provides the capability to create forms for input and output of data when used with a computer. In addition, your terminal can be instructed to dial a phone number displayed in a form and the soft keys can be relabeled by the application program running on the computer. Together, these features make your terminal a powerful and unique computer peripheral.

18.2 ESCAPE SEQUENCES

Forms control, dialing, soft key control and terminal compatibility features are provided through escape sequences. The escape sequences consist of the ASCII character ESCAPE (27 decimal) followed by one or more alphanumeric or punctuation characters. The escape sequences are mnemonic and contain no encoded values. This makes them easy to use in applications programs. The escape sequences are available when using the terminal either with RS-232 serial port or the modem.

The following escape sequences are provided. The < , > and blanks shown in the escape sequences below are for clarity only and must not be included in the escape sequences. See example in 18.2.4.

18.2.1 Cursor Control

ESC(u - Move the cursor up one line (equivalent to up arrow).

ESC(d - Move the cursor down one line (equivalent to down arrow)

ESC(l - Move the cursor left one character position (equivalent to left arrow).

ESC(r - Move the cursor right one character position (equivalent to right arrow).

ESC(x dd - Position the cursor in a line at columns 1 through 80 where dd is replaced with two ASCII digits 0-9. For example, ESC(x 0 9 positions the cursor in column 9. The cursor is positioned in column 80 if dd is greater than 80 and in column 1 if dd is 00. This escape sequence also sets the left hand limit for cursor movement in protect mode (explained in the next section).

ESC(y dd - Position the cursor on the display in lines 1 through 12 where dd is replaced with two ASCII digits 0-9. For example, ESC(y 0 5 positions the cursor in the fifth line of the display. The column position is unaffected. The cursor is positioned in the last displayed line if dd is greater than the number of lines currently displayed and in line 1 if dd is 00.

ESC(Y dd - Position the cursor in line dd of the 56 line display memory buffer. The display will be scrolled as necessary. For example, ESC(Y 2 5 positions the cursor in line 25 of the display memory buffer. If the display was scrolled down, line 25 will be the top line of the display. If the display was scrolled up, line 25 will be the bottom line of the display. If line 25 was already displayed, the display will not be scrolled. The column position of the cursor is unaffected. The cursor is positioned in line 56 if dd is greater than 56 and in line 1 if dd is 00.

ESC(X dd -	Set the right hand limit for cursor movement in protect mode where dd is replaced with two ASCII digits 0-9. For example, ESC(X 2 0 prevents the cursor from moving from left to right through column 20 if protect mode is on. Protect mode is described in the next section. This escape sequence does not change the cursor position. If dd is greater than 80, the line limit is set to 80. If dd is 00, the line limit is set to 1.
ESC(H -	Home the cursor. Position the cursor in line 1 of the display memory and in column 1 of the display.

18.2.2 Forms Control

ESC(P 1 -	Turn on protect mode. In protect mode, the cursor is controlled solely by the cursor control escape sequences. The arrow keys on the keyboard are ignored and the RETURN key transmits a carriage return but does not change the cursor position. Cursor movement within a line is limited on the left by the last ESC(x dd escape sequence and on the right by the last ESC(X dd escape sequence. This prevents the terminal user from backspacing or typing over parts of a form. For example, the escape sequences ESC(X 3 0 ESC(x 2 0 ESC(P 1 sets up an input field between columns 20 and 30, turns on protect mode and leaves the cursor at the start of the input field.
ESC(P 0 -	Turn off protect mode. Protect mode should be turned off prior to transmitting the text of a form if parts of the form are to be displayed in protected line areas.
ESC(K 0 -	Turn off the keyboard. With the keyboard turned off, the user is prevented from entering data. The cursor is not displayed when the keyboard is off.
ESC(K 1 -	Turn the keyboard and the cursor back on.
ESC(I 0 -	Turn off display of input. In this mode, keys entered on the keyboard are transmitted, but a blank is displayed instead of the key. This is useful for entering passwords in half duplex mode (KEY TRANSMIT WITH ECHO). In full duplex operation (KEY TRANSMIT WITHOUT ECHO), this escape sequence has no effect.
ESC(I 1 -	Turn display of input back on.
ESC(B -	Clear from cursor to end of line.
ESC(C -	Clear the display memory to the end starting at the cursor position.
ESC(c dd -	Clear the next dd characters starting at the cursor position where dd is replaced by two ASCII digits from 0-9. For example, ESC(c 0 8 clears the eight character positions following the cursor. The cursor position does not change. Up to 99 characters can be cleared and the operation will continue into new lines as necessary.
ESC(U dd -	Underline the next dd characters starting at the cursor position where dd is replaced by two ASCII digits from 0-9. For example, ESC(U 2 3 underlines the next 23 characters starting at the cursor position. The cursor position does not change. Up to 99 characters can be underlined and the operation will continue into new lines as necessary.

ESC(T dd - Transmit the next dd characters starting at the cursor position where dd is replaced by two ASCII digits from 0-9. For example, ESC(T 1 0 transmits the next 10 characters from the display memory starting at the cursor position. The cursor position does not change. Up to 99 characters can be transmitted and the operation will continue into new lines as necessary.

18.2.3 Dialing from Forms

These two escape sequences can be used by an application program to cause your terminal to place a voice call to a phone number displayed in a form and to hang up after the call. If the modem is in use, these escape sequences cannot be used because the phone line is required by the modem.

ESC(D dd - Dial the next dd characters starting at the cursor. The characters must constitute a valid phone number consisting of the digits 0-9, blanks, dashes (-) or the symbols * (wait for new dial tone) and # (pause for five seconds). When this escape sequence is received, your terminal will check for a valid phone number, go off-hook, wait for dial tone and dial the number. The following codes are transmitted to indicate the result of the dialing operation.

{c} Dialing operation was completed

{n} Invalid phone number found

{f} Dialing operation failed because modem is in use or dialing was aborted by the user

{d} No dial tone was found

The codes are transmitted enclosed in the braces and followed by a carriage return. Since the braces do not appear on the keyboard, these code sequences can only be transmitted by the escape dialing operation. The dialing operation does not change the cursor position.

ESC(h - Hang up. If your terminal is off-hook and the modem is not being used, this escape sequence causes the terminal to hang up.

18.2.4 Soft key Control

ESC(s <d> <t> <label> <t>

- This escape sequence allows the soft keys to be relabeled by an application program using your terminal on RS-232 or the modem. The <d> is replaced by a single ASCII digit from 1 to 5 corresponding to the five soft keys. Soft key 1 is the left most soft key. The <t> is a string terminator and may be any ASCII character that does not occur in label . The <label> is the text of the soft key label displayed as two lines of fifteen characters each. The first fifteen characters are displayed in the top line and the rest of the characters are displayed in the bottom line. Soft key 3 has sixteen character spaces per line. If <label> is shorter than the total soft key length, the rest of the existing label is unchanged. The <label> is terminated by the second occurrence of <t> or after 30 characters (32 characters for soft key 3).

ESC(s d - Display the escape soft keys. The labels specified by the above escape sequence are stored in a special soft key buffer. This escape sequence transfers the soft key buffer to the soft key display.

ESC(s c - This escape sequence clears the entire soft key buffer. The soft key buffer should be cleared prior to specifying new labels to make sure all old labels are erased.

ESC(s b - This escape sequence changes the soft keys back to the standard computer terminal soft keys displayed prior to the first ESC(s d escape sequence. It is used when the applications program wishes to return control of the soft keys to your terminal. ESC(s b has no effect unless escape soft keys are displayed.

ESC(s B - This escape sequence turns off the escape soft key display. It is used when a twenty-four line display is required. ESC(s B has no effect unless escape soft keys are displayed.

As an example, the escape sequences

```
ESC(s c
ESC(s 3 x   Hang Upx
ESC(s 1 /    Dial This        Number/
ESC(s d
```

result in the soft keys changing to:

```
Dial This                        Hang Up
 Number
```

When the escape soft keys are displayed, your terminal will transmit a key code when the soft key is pressed. The codes transmitted are:

{1} for soft key 1
{2} for soft key 2
{3} for soft key 3
{4} for soft key 4
{5} for soft key 5
{6} for the BACK key

The key codes are transmitted enclosed in braces and followed by a carriage return.

When the BACK key is pressed, the key code {6} is transmitted. This can be used as a signal to the applications program to change the soft keys displayed. Your terminal will not change the soft key labels unless instructed to do so by either ESC(s d or ESC(s b. To return to the standard terminal soft keys, hold down the shift key on the keyboard and press the BACK key.

18.2.5 Debugging Aids

All escape sequences can be tried out using the keyboard prior to incorporating them in a program if desired. The ESCAPE character is generated by pressing the [key while holding down the CTRL key. If the keyboard is turned off using ESC(K 0, it can only be turned back on by pressing the BACK key and then re-activating the modem or RS-232.

Two escape sequences are also provided as debugging aids.

ESC(F 1 - Turn on display functions mode. In display functions mode all ASCII control codes and escape sequences are displayed as well as executed. This can be used to make sure that the correct control characters are being sent by an application program.

ESC(F 0 - Turn off display functions mode.

18.2.6 Terminal Compatibility

The following escape sequences are provided so your terminal is compatible in cursor addressing and line clearing with two commonly used terminals. Also see SCREEN ADDRESSING CHART on following page.

ADDS Type Terminal

ESC Y <row> <col> - Cursor positioning. Offset is 20 HEX.

- Rows are from: "SPACE" = 20H (32_{10}), row 1 to "7" = 37H (55_{10}), row 24

- Columns are from: "SPACE" = 20H (32_{10}), col 1 to "o" = 6FH (111_{10}), col 80

ESC K - Clear from cursor to end of line

Lear Siegler ADM 31 Type Terminal

```
ESC = <row> <col>     - Cursor positioning.  Offset is 20 HEX.

                                                 32₁₀                55₁₀
                      - Rows are from: "SPACE" = 20H      to  "7"  = 37H
                                                 row 1               row 24

                                                    32₁₀             111₁₀
                      - Columns are from: "SPACE" = 20H to  "o"  =   6FH
                                                    col 1            col 80

ESC T                 - Clear from cursor to end of line

ESC E                 - Insert a line above line containing cursor

ESC R                 - Delete line containing cursor
```

18.3 SCREEN ADDRESSING CHART

```
1         10        20        30        40        50        60        70        80
•         •         •         •         •         •         •         •         •
SP!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
 !
 "
 #
 $                                                             X - Example 1
 %
 &
 '
 (
 )
 *                                             X - Example 3
 +
 ,      Soft key border in 16 line mode
 -
 .
 /                              X - Example 4
 0
 1
 2   X - Example 2
 3
 4      Soft key border in 24 line mode
 5
 6
 7
```

The cursor can be moved to any screen position by transmitting the appropriate escape, row and column code.

18.3.1 Examples

```
1. Your terminal            ESC(y05 ESC(x62
2. Your terminal            ESC(Y19 ESC(x04
3. ADDS type terminal       ESC Y * M
4. ADM 31 type terminal     ESC = / ?
```

19 APF

STRUCTIONS

19.1 PA

Us
i
A
F

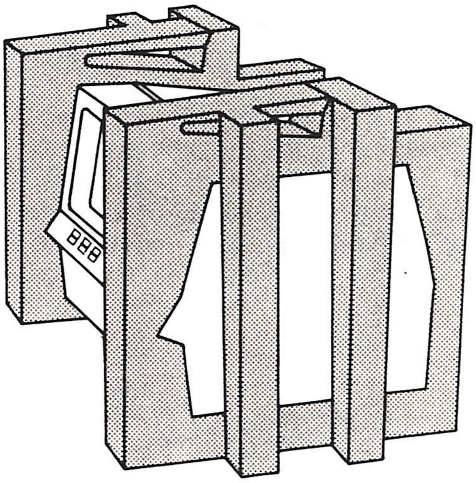
riginal shipping box and
These include:

erior box
foam end caps
dboard tray

wing the procedure below when
ng your terminal:

Make sure your terminal's power cord is unplugged. Then disconnect the handset, telephone line and keyboard cords from the display housing. To unplug these cords, depress the tabs on the modular jacks and pull the jacks directly away from their plugs.

2. Place the end caps on each side of the unit. Note that there is a right and left end cap.



3. Lower the display housing with end caps carefully into the box.

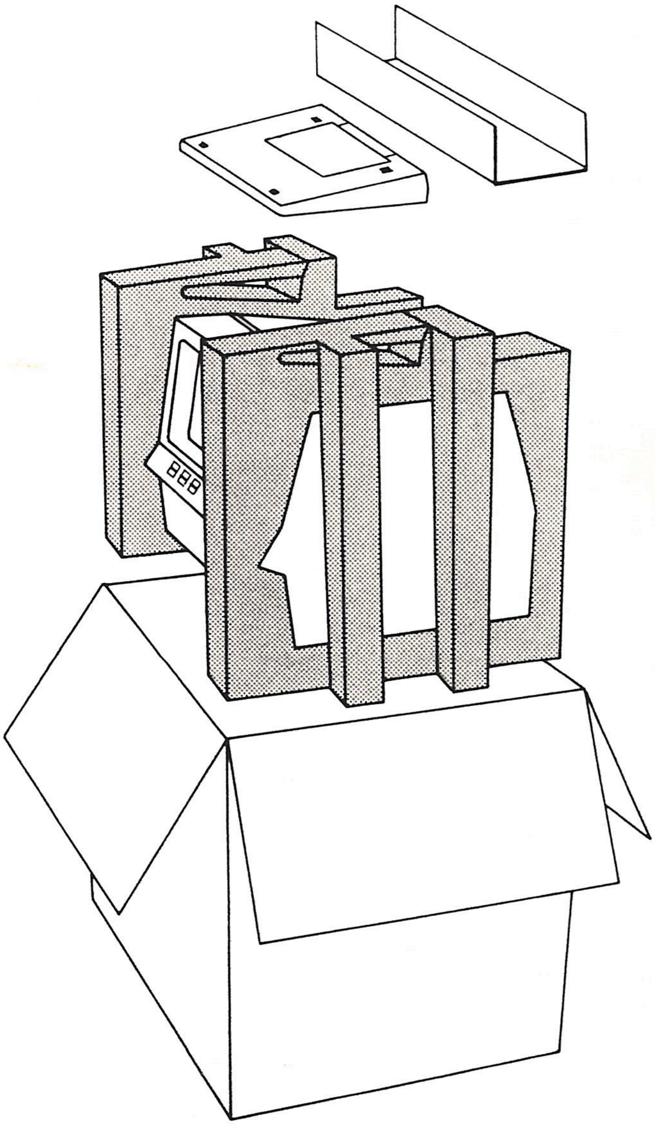
4. Unplug the keyboard cord and set aside. Place the keyboard, upside down, above the display housing in the cut-outs in the end caps. The flaps are cut to make insertion easy.

5. Insert the cardboard tray in the notches of the end caps at the top rear of the display housing.

6. Place the handset with cord and keyboard cord in this tray.

7. Include a sheet of paper indicating what is wrong with the terminal.

8. Seal the box with a reinforced shipping tape.



4. Lower the display housing gently into the interior box. Grip the housing with two hands as shown at right.

5. Insert the cardboard tray on top of the terminal as shown in the illustration at right.

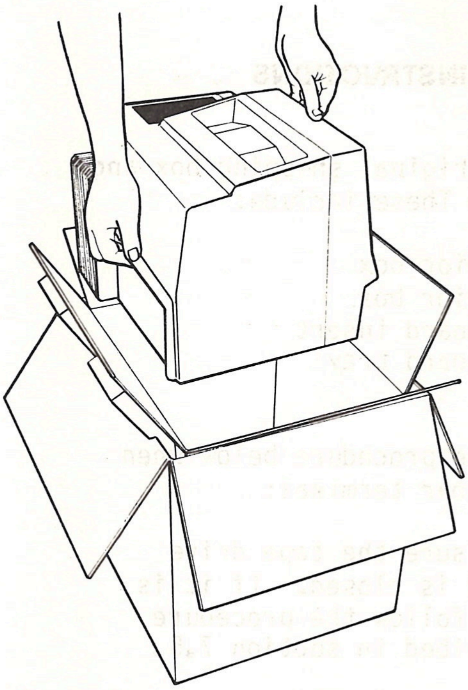
6. Leave the keyboard cord plugged into the keyboard and place the keyboard in the larger tray compartment.

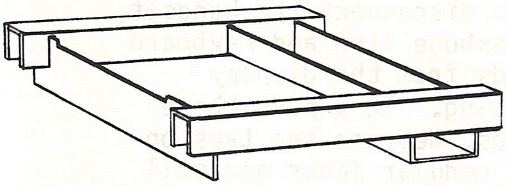
7. Place the handset in the smaller tray compartment.

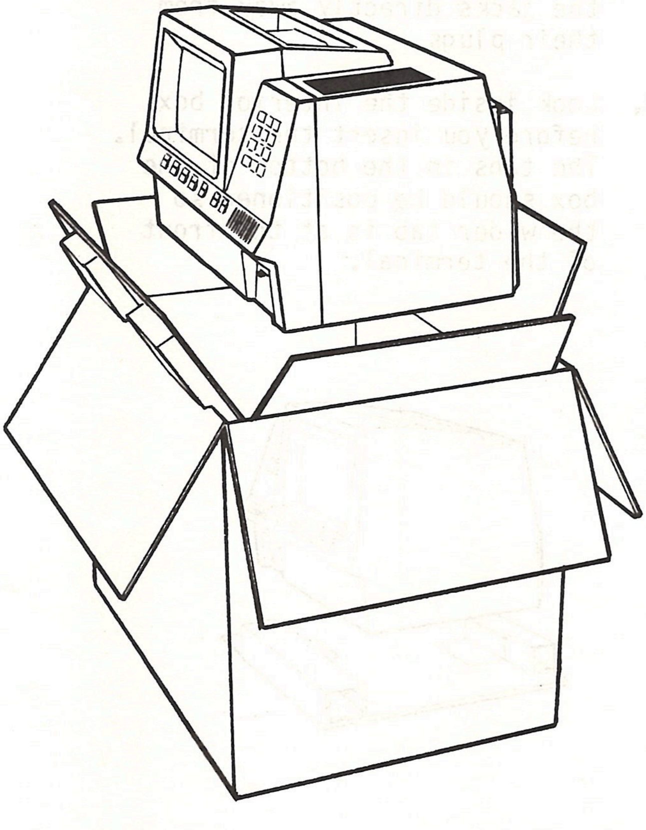
8. Include a sheet of paper indicating what is wrong with the terminal.

9. Fold in the two flaps on the interior box which do not have foam padding on them.

10. Seal the interior and exterior boxes with a reinforced shipping tape.







20 APPENDIX F

20.1 TERMINAL SPECIFICATIONS

DISPLAY

Type

- Cathode Ray Tube
- 9" diagonal
- P31 green phosphor with high contrast dark background
- Non-glare etched glass face
- 60 frames per second

Screen Format

- 16 or 24 lines X 80 characters per line
- Frame or scroll through 56 lines

Character Format

- 7 X 9 dot matrix in 8 X 12 dot block
- Pica size
- Full descenders for lower case characters
- 52 upper and lower case alphabetic characters
- 10 numerals
- 26 punctuation and math symbols

Cursor Format

- Blinking underline or reverse video blocks

MAIN KEYBOARD

Type

- Capacitive
- .150" full travel
- 1.5 oz. actuating force
- Stepped and sculptured profile
- Meets DIN ergonomic requirements
- Detached
- 10 million cycles per switch rated life

Keyboard Format

- Secretarial (QWERTY) key locations

Character Set

- 10 number keys, 45 alphanumeric keys, space bar, 2 shift keys, shift lock with indicator light, return, backspace, tab
- 4 cursor control keys (up, down, left, right)
- Control key

Functions

- N-key rollover
- Automatic repeat at 10 characters per second after 1 second hold delay

Text Editor

- Full cursor control
- Word wrap in PARAGRAPH MODE
- Tab set/tab clear
- Vertical scroll through 56 lines
- Clear, insert or delete text by line or character and clear page, scroll up and scroll down

SOFT KEY KEYBOARD

Type

- Lever operated sealed tactile dome
- .070 in. full travel
- 6 oz. actuating force
- 10 million cycles per switch rated life
- Integral to main housing beneath CRT

Keyboard Format

- 5 keys whose functions are explained by labels on bottom of CRT display plus two special function keys (Back and Help)

TELEPHONE DIAL KEYBOARD

Type

- Key top operated conductive elastimer
- .1 in. full travel
- 5 oz. actuating force
- 20 million cycles per switch related life
- Integral to main housing to the right of the CRT

Keyboard Format

- Standard telephone keypad configuration
- 3 X 4 matrix
- 10 numerals plus * and # functions

ELECTRONIC FUNCTION GROUPS

Computer

- Z80, 8 bit microprocessor
- 16K RAM for user information storage, battery backed up to insure data retention for up to one year
- 24K ROM for system text and soft key labels
- 32K ROM for operating system

Real Time Clock

- Crystal controlled to .01%
- Resettable
- Battery backed up with RAM memory

Clock Format

- Hour, minutes, AM/PM, day of week, month, day, year (example: 11:05 AM Thursday December 7, 19XX) perpetual through the year 2099

OTHER USER CONTROLS

CRT Intensity	- Manually adjustable
Ringer and Loudspeaker	- Manually adjustable volume control

TAPE RECORDER

Location	- In top of terminal housing
Control	- Computer controlled, solenoid operated
Type	- Two track; two head (one track voice, one track data)
Cassette	- Certified C60
Audio Functions	- Record, playback, fast forward, rewind, tape eject, stop, auto stop
Tape Counter	- Show relative location of tape
Tape Speed	- 1 7/8 IPS

TELEPHONE LINE CONNECTOR

Type	- Six wire modular jack (USOC-RJ11C) - Tip, ring, A and A1

TELEPHONE HANDSET/HEADSET CONNECTOR

Type	- Four wire modular jack

ASCII RS-232 SERIAL PORT DTE CONNECTOR

Receptacle	- 25 pin "D" subminiature (AMP 205436-1 or equivalent for mating cable) Pin 2 - transmitted data 3 - received data 4 + request to send 5 + clear to send 6 + data set ready 7 signal ground 8 + carrier detect 20 + data terminal ready

Data Format

- Serial, binary, asynchronous

Baud

- User selectable (9600, 4800, 2400, 1200, 600, 300, 150, 110 baud)

Parity

- Odd, even or none

Bits per Character

- 7 bits or 8 bits

PRINTER

Function

- Print messages, directory, calendar, formatted tape index, text, from serial interface or modem

Interface

- Industry standard parallel Centronics type

Connector

- Edge card
- 20 position by 2 row (Berg 65764-800 or equivalent for mating cable)

Interface

- 1 - data strobe	2 ground
3 + data bit 1	4 ground
5 + data bit 2	6 ground
7 + data bit 3	8 ground
9 + data bit 4	10 ground
11 + data bit 5	12 ground
13 + data bit 6	14 ground
15 + data bit 7	16 ground
17 + data bit 8	18 ground
19 - acknowledge	20 ground
21 + busy	22 ground
23 + paper empty	24 ground
25 + on-line	26 init out
27 ground	28 unused
29 NC	30 NC
31 ground	32 NC
33 NC	34 NC
35 NC	36 (Do not use)
37 NC	38 NC
39 NC	40 NC

DATA MODEM

Function

- Fully integrated into operating system
- Send text and data message
- Access time sharing data bases
- Access local data
- Access other 103J Bell standard equipment

Transmission

- Direct Connect
- Full duplex
- Odd, even, or no parity
- Character, line or block

Modulation

- U.S. Standard

Data Rate

- 300 baud

Compatability

- Bell standard 103J originate or receive
- Transmit Frequencies:
  - Originate: Mark : 1270HZ (+,-.5%)
    Space: 1070HZ (+,-.5%)
  - (4103A) Answer: Mark : 2225HZ (+,-.5%)
    Space: 2025HZ (+,-.5%)
- Receive Frequencies:
  - Originate: Mark : 2225HZ
    Space: 2025HZ
  - (4103A) Answer: Mark : 1270HZ
    Space: 1070HZ
- Transmitter:
  - On Delay: Coincident with carrier in originate, continuously on in answer
  - Off Delay: 4 sec. (+,-.5sec.) in originate
  - Level: -10dBm

PHYSICAL DIMENSIONS

Display Housing

- 15 7/8" (40.3 cm) wide x 12 3/4" (32.3 cm) deep x 10 3/4" (27.3 cm) high

Keyboard Housing

- 13" (33 cm) wide x 6 11/16" (17 cm) deep x 1 13/32" (3.5 cm) high

WEIGHT

Use Weight

- 27 lbs (12.2 kg)

Shipping Weight

- 37 lbs (16.8 kg)

MATERIALS

Terminal Housing

- Steel chassis with impact resistant plastic enclosure

Keyboard Housing

- Impact resistant plastic enclosure

21 INDEX

- Adding Directory Entries 5.1.2
- Adding Calendar Entries 13.2
- Addressing Chart, Screen 18.3
- Aids to Debugging Escape Sequence 18.2.5
- Alarm Reminders, Calendar 13.7
- Answer Soft Keys 4.3, 10.3.2
- ANSWER THE PHONE Soft Key 10.3.2
- Answering, ASCII as Normal Phone Mode 17.1.1

- Answering Automatically 9.0
  - And Printing Messages 9.3
  - With a Recorded Message, Formatted Tape 9.2
  - With Modem - RS232 .... 9.5
  - With Voice Message 9.4

- Answering Text Calls Manually 10.3
- ASCII as Normal Phone Mode 17.1
- ASCII Control Codes 12.12
- Attachment to Computers 12.1

- Automatic Answer 9.0
  - Modem - RS232 .... 9.5
  - Operation 9.1
  - Printing Message 9.2
  - Recording Messages on Formatted Tape 9.3

- Automatic Editing Features, PARAGRAPH MODE Soft Key 6.2.3

- Automatic Message Sending
  - Adding a New Message 8.5
  - Changing a Message Entry 8.7
  - Checking Message Status 8.4
  - Creating a New Voice Message 8.8
  - Deleting a Message Entry 8.6
  - Delivered Messages 8.9.3
  - Displaying the Entry 8.4.1
  - Entering Phone Numbers 8.2.2
  - Entering a Time and Date 8.2.1
  - How a Message Is Sent 8.9
  - Operation 8.1
  - Priority 8.9.1
  - Replacing a Message Entry 8.6
  - Saving the Entry 8.2.3
  - Sending From the Message Memory 8.2
  - Sending From a Formatted Tape 8.3
  - Stopping 8.9.2
  - Undelivered Messages 8.9.4

- Automatically Recorded Messages, Reviewing 9.3.2
- Back Key 1.9.3
- Baud Rate Configuration, RS232 Serial Port 12.6.3
- Blank Display 1.3
- Block Transmit Mode, Text Communication 10.4.3
- Block Transmit Mode, RS232 Serial Port 12.7.3

- BREAK SOFT Key
  - Computer Terminal 12.4
  - Modem 11.3

- Calendar, Electronic 13
  - Adding Entries 13.2
  - Alarm Reminders 13.7
  - Completing the Entry 13.2.4
  - Date Entries 13.2.2
  - Day Entries 13.2.3
  - Deleting Entries 13.5
  - Editing Entries 13.6
  - Printing the Calendar 13.8
  - Reviewing Entries 13.4
  - Space Available for Entries 13.3
  - Time Entries 13.2.1

- Call Answering
  - Answer Soft Keys 4.3
  - Automatically (See Automatic Answer)
  - Text Calls, Manually 10.3
  - Text Calls, ANSWER THE PHONE Soft Key 10.3.2

- Call Timing 4.6

- Calling
  - ASCII as Normal Phone Mode 17.1.2
  - Databases, Over the Phone Line 11.1
  - Remote Computers, Over the Phone Line 11.1
  - Text Communication 10.1.1

- Cassettes, Tape 7.1.1
  - Unloading Formatted 7.3.5
  - Unloading Voice 7.2.6

- CHANGE CALL MODE Soft Key, Voice/Text 10.1.1

- Changing
  - Date and Time Display 2.1
  - Directory Entries 5.1.3
  - Message Entry, Automatic Message Send 8.7
  - Ringer 4.7
  - Transmit Mode, Modem 10.4.4

- Character Length
  - RS232 Serial Port 12.6.1
  - Modem 10.5.1

- Character Transmit Modes, Text 10.4.1
- Characteristics, External Printer 14.1
- Chart, Screen Addressing 18.3
- Checking Message Status, Automatic Message Send 8.4
- Checking Time and Date When Display is Blank 2

- Cleaning
  - Plastic Housing 1.8.2
  - Recorder 7.6.1

Clock 2.0
Closing the Tape Drive Door 7.5
Compatibility With Terminals, Escape Sequences 18.2.6
Communication, Text 10
Completing an Interrupted Operation 4.4.1
Completing the Calendar Entry 13.2.4
Components of DataVoice Terminal 1.1

Computer Terminal 12
  ASCII Control Codes 12.11
  Baud Rate Configuration 12.6.3
  Block Transmit Mode 12.7.3
  Character Length Configuration 12.6.1
  Connecting the RS232 Serial Port to the Phone Line Modem 12.9
  Copying the Display Memory Contents on Tape 12.8.3
  Custom Forms Display 12.11
  Display, 24 Lines 12.3
  Key Transmit Modes 12.7.1
  Line Transmit Mode 12.7.2
  Parity Configuration 12.6.2
  Preventing Data Overruns 12.10
  RS232 Serial Port 12.2
  Transmit Modes 12.7
  TRANSMIT Soft Key 12.7.4
  USE XON/XOFF Soft Key 12.7.5

Connecting the RS232 Serial Port to the Phone Line Modem 12.9
Configuring the Modem, Text Communication 10.5
Configuring the RS232 Serial Port, Computer Terminal 12.6
Conservation of Power 1.3
Control Codes, ASCII 12.12
Control of Soft Keys, Escape Sequences 18.2.4
Controls, Operating 1.9
Controls, Voice Tape Recorder 7.2.1
Copying the Display Memory in the Message Memory 12.8.2
Copying the Display Memory on Tape 12.8.3
Copying the Display Memory Contents 12.8
Correcting an Error in Mode Selection, Text Communication 10.1.2
Creating a New Voice Message, Automatic Message Send 8.8
Creating Text Messages 6.2
Cursor Control Escape Sequences 18.2.1
Custom Forms Display 12.10, 18.1
Data Terminal, Remote 11
Database, Calling Over the Phone Line 11.1
Date and Time Entry, Automatic Message Send 8.2.1
Date Changing, Clock 2.1
Date Entries, Adding to Calendar 13.2.2
Day Entries, Adding to Calendar 13.2.3
Debugging Aids, Escape Sequences 18.2.5
Delayed Dialing Soft Keys 4.5

Deleting
  Calendar Entries 13.5
  Directory Entries 5.5
  Message Entries, Automatic Message Send 8.6

Delivered Messages, Automatic Message Send 8.9.3
Demagnetizing, Recorder Maintenance 7.6.2

Description
  Tape Operation 7.1
  Text Messages 6.1

Dialing
  Directory Entries 5.3
  Displayed Directory Entries 5.3.1
  From Forms, Escape Sequences 18.2.3
  Multiple Directory Entries 5.3.4
  Quick Access Numbers 5.3.3
  Telephone Numbers 4.1, 4.5.1
  Typed Names 5.3.2

Dictation Recording 7.2.3
Direct Attachment to Computers 12.1
Directory, (See Telephone Directory)
DISPLAY CALL TIMER Soft Key 4.6.2

Display
  Blank 1.3
  Custom Forms, Computer Terminal 12.10, 18.1
  Framing Error Symbol 10.5.1, 12.6.1
  Modem, 24 Lines 11.2
  Parity Error Symbol 10.5.2, 12.6.2
  RS232 Serial Port, 24 Lines 12.3
  Screen Addressing Chart 18.3
  Tape Counter 7.2.2

Display Memory
  Copying Contents 12.8
  Copying in Message Memory 12.8.2
  Copying on Tape 12.8.3
  Features 15
  Printing Contents 12.8.1
  Saving Messages in 10.2.3
  Sending Stored Messages From, During a Call 10.2.4
  Size 10.2.1
  Text 10.2
  Viewing Text 10.2.2

Displaying Text Messages Stored on Tape 6.3.4
Displaying the Tape Index, Formatted Tape 7.3.7
Door, Closing Tape Drive 7.5

Editing
  Calendar Entries 13.6
  Directory Entries 5.4
  Keyboard 6.2.1
  Paragraph Mode 6.2.3
  Taped Text Messages 6.3.5
  Soft Keys 6.2.2
  Text Messages 6.2

Elapsed Time Display 4.6.1
Electronic Calendar .... (See Calendar)
Electronically Saving Text Messages 10.2.3
Entries .... (See Automatic Message Sending, Calendar, Telephone Directory)
Entry Space Available, Calendar 13.3
Entering a Time and Date, Automatic Message Sending 8.2.1
Entering Phone Numbers, Automatic Message Sending 8.2.2

Entering Your Phone Number, Automatic Answering 9.3.1
Error in Text Call Mode Selection, Correcting 10.1.2

Escape Sequences 18.2
  Cursor Control 18.2.1
  Debugging Aids 18.2.5
  Dialing from Forms 18.2.3
  Forms Control 18.2.2
  Soft Key Control 18.2.4
  Terminal Compatibility 18.2.6

Examples, Screen Addressing 18.3.1
External Printer 14

Formatted Tape
  Copying Display Memory on 12.8.3
  Copying Message Memory on 6.3.3
  Displaying Tape Index 7.3.7
  Features 7.3
  Formatting 7.3.1
  Printing Index 7.4
  Recording Phone Conversations 7.3.3
  Recording Voice Messages 7.3.2
  Sending Voice and Text Messages 8.3
  Using Previously Formatted Tape 7.3.6

Formatting a Tape 7.3.1

Forms
  Control, Escape Sequences 18.2.2
  Custom Display 12.10, 18.1
  Dialing from, Escape Sequences 18.2.3

Framing Error Symbol 10.5.1, 12.6.1
Hanging Up 4.1, 4.2.1
Headset Use 4.8
Help Key 1.9.4
HOLD Soft Key 4.2.2
HOME Soft Keys 1.9.2
How a Message is Sent, Automatic Message Send 8.9
IGNORE THIS CALL Soft Key 4.3.2

Index
  Displaying Formatted Tape 7.3.7
  Printing Formatted Tape 7.4

Instructions on Packing 19.1

Key Transmit Modes
  Text Communication 10.4.1
  Computer Terminal 12.7.1

Line Transmit Mode
  Text Communication 10.4.2
  Computer Terminal 12.7.2

Loudspeaker Volume Control 1.9.5
Making Calls, ASCII as Normal Phone Mode 17.1.2
Making a Text Communication Call 10.1.1

Maintenance
- User........ 1.8
- Recorder........ 7.6

Management of Time........ 13.1
Managing Messages........ 6.3
Manipulating a Reviewed Text Message........ 7.3.9

Manually Answering Text Calls........ 10.3
- ANSWER THE PHONE Soft Key........ 10.3.2
- Handset........ 10.3.1

Memory
- Display........(See Display Memory)
- Message........(See Message Memory)
- Usage........ 16.1

Message Management........ 6.3

Message Memory
- Automatic Sending From the........ 8.2
- Copying the Display Memory Contents in........ 12.8.2
- Features........ 15
- Sending From During a Call........ 10.2.4

Message Printing........ 6.3.1, 9.2, 10.6

Message Recording
- For Automatic Answering........ 9.4
- On Formatted Tape........ 9.3

Message Sending, Automatic........(See Automatic Message Sending)

Message Status
- Changing Automatic Sending........ 8.7
- Checking Automatic Sending........ 8.4

Message, Voice........ (See Voice Message)

Messages
- Automatically Sending........ 8
- Delivered Automatically........ 8.9.3
- Displaying Taped........ 6.3.4, 7.3.8
- Editing Taped........ 6.3.5, 7.3.9
- Manipulating Reviewed Text........ 7.3.9
- Priority, Automatic Sending........ 8.9.1
- Reviewing Taped........ 7.3.8
- Saving Text Electronically........ 10.2.3
- Sending Over the Phone Line........ 6.3.2
- Sending Text During a Call........ 10.2.4
- Storing Text on Formatted Tape........ 6.3.3, 7.3.4
- Storing Voice on Formatted Tape........ 7.3.2
- Text........ 6
- Undelivered, Automatic Sending........ 8.9.4

Mode Selection Error, Text Call........ 10.1.2

- Modem
  - Character Length....... 10.5.1
  - Configuration....... 10.5
  - Connecting the RS232 Serial Port....... 12.9
  - Display, 24 Line....... 11.2
  - Parity....... 10.5.2
  - Transmission Modes....... 10.4

- Modem-RS232
  - Automatic Answering With....... 9.5
  - Connecting....... 12.9
  - Preventing Data Overruns....... 12.10

- Modes
  - RS232 Serial Port Transmit....... 12.7
  - Text Transmission Over the Phone Line Modem....... 6.3.2, 10.4

- Multiple Directory Entry Dialing....... 5.3.4
- Normal Phone Mode as ASCII....... 17.1

- Operation
  - Automatic Answer....... 9.1
  - Automatic Message Sending....... 8.1
  - External Printer....... 14.2
  - Tape....... 7
  - Text Communication....... 10.1

- Packing Instructions....... 19.1
- PARAGRAPH MODE Soft Key....... 6.2.3

- Parity
  - Error Symbol....... 10.5.2, 12.6.2
  - Modem Configuration....... 10.5.2
  - RS232 Serial Port Configuration....... 12.6.2

- PBX Hookflash....... 4.2.4
- Phone....... (See Telephone)
- Phone Soft Keys....... 4.2
- Playing Tape Recordings....... 7.2.5
- Playing Voice Messages Over the Phone Line....... 7.3.10
- Power Conservation....... 1.3
- Power Fail Recovery....... 1.4
- Power Failure, User Maintenance....... 1.8.1
- Precautions, User....... 1.7

- Printer
  - Characteristics....... 14.1
  - External....... 14
  - Operation....... 14.2

- Printing
  - Automatic Answer Messages....... 9.2
  - Calendar....... 13.8
  - Display Memory Contents....... 12.8.1
  - Formatted Tape Index....... 7.4
  - Telephone Directory....... 5.6
  - Text Communication....... 10.6
  - Text Messages....... 6.3.1

Previously Formatted Tape, Using.................................... 7.3.6
Priority, Automatic Message Sending................................. 8.9.1
Quick Access Numbers.. 5.3.3
Recorder.. (See Tape Recorder)
Recorded Messages, Reviewing Automatically Answered................. 9.3.2

Recording
  Automatically Answered Calls...................................... 9.3
  Dictation... 7.2.3
  Phone Conversations on Formatted Tape............................. 7.3.3
  Phone Conversations on Voice Tape................................. 7.2.4
  Text Messages on Formatted Tape................................... 7.3.4
  Voice Messages on Formatted Tape.................................. 7.3.2

Recordings, Playing Tape.. 7.2.5

Redialing
  Busy or Unanswered Calls.. 4.2.3
  Same Telephone Number... 4.5.2

Returning to HOME Soft Keys... 4.4.2
Reminders, Calendar Alarm... 13.7
Remote Computers, Calling Over the Phone Line....................... 11.1
Remote Data Terminal.. 11

Replacing Message Entries, Automatic Message Send................... 8.6
Reviewed Text Messages, Manipulating................................ 7.3.9

Reviewing
  Automatically Recorded Messages................................... 9.3.2
  Calendar Entries.. 13.4
  Taped Messages.. 7.3.8

Ringer, Changing.. 4.7
RS232... (See Serial Port)

RS232-Modem
  Automatic Answer With... 9.5
  Connecting.. 12.9
  Preventing Data Overruns.. 12.10

Saving Automatic Message Send Entries............................... 8.2.3
Saving Text Messages Electronically................................. 10.2.3
Screen Addressing Chart... 18.3

SEND BREAK Soft Key
  Computer Terminal... 12.4
  Modem, Remote Data Terminal....................................... 11.3

Sending
  Messages Automatically.. 8
  Messages From Message Memory.................................... 8.2, 10.2.4
  Messages Over the Phone Line...................................... 6.3.2
  Stored Text Messages During a Call................................ 10.2.4
  Text or Voice Messages From a Formatted Tape...................... 8.3

Terminal Compatibility, Escape Sequences.......... 18.2.6

Terminal
  Computer.......... 12
  Remote Data.......... 11
  Specifications.......... 21.1

Testing Terminal Status.......... 1.5

Text Call Answering
  ANSWER THE PHONE Soft Key.......... 10.3.2
  Automatically.......... 9.1
  Handset.......... 10.3.1
  Manually.......... 10.3

Text Communication.......... 10
  Making a Call.......... 10.1.1
  Modem Configuration.......... 10.5
  TRANSMIT Soft Key.......... 10.4.5

Text Messages
  Displaying From Tape.......... 6.3.4
  Editing With Soft Keys.......... 6.2.2
  Editing With Keyboard.......... 6.2.1
  Manipulating Reviewed.......... 7.3.9
  Printing.......... 6.3.1
  Recording on Tape.......... 7.3.4
  Saving Electronically.......... 10.2.3
  Sending During a Call.......... 10.2.4
  Sending Automatically From Formatted Tape.......... 8.3
  Storing on Tape.......... 6.3.3

Text Transmission Modes, Modem.......... 10.4
  Block.......... 10.4.3
  Changing.......... 10.4.4
  Key.......... 10.4.1
  Line.......... 10.4.2
  Single Character.......... 10.4.1
  TRANSMIT Soft Key.......... 10.4.5
  USE XON/XOFF Soft Key.......... 10.4.6

Text Viewing, Display Memory.......... 10.2.2
Time and Date, Viewing When Display is Blank.......... 1.3

Time and Date Entry
  Automatic Message Sending.......... 8.2.1
  Clock.......... 2.1
  Electronic Calendar.......... 13.2

Time Management.......... 13.1

Transmit Modes
  Block, Modem.......... 10.4.3
  Block, RS232 Serial Port.......... 12.7.3
  Key, Modem.......... 10.4.1
  Key, RS232 Serial Port.......... 12.7.1
  Line, Modem.......... 10.4.2
  Line, RS232 Serial Port.......... 12.7.2

TRANSMIT Soft Key
- Computer Terminal........ 12.7.4
- Modem........ 10.4.5
- RS232 Serial Port........ 12.7.4
- Text Communication........ 10.4.5

Twenty-Four Line Display
- Computer Terminal........ 12.3
- Modem........ 11.2
- Remote Data Terminal........ 11.2
- RS232 Serial Port........ 12.3

Typed Name Dialing........ 5.3.2
Types of Directory Entries........ 5.1.1
Undelivered Messages, Automatic Message Sending........ 8.9.4
Unloading a Formatted Tape........ 7.3.5
Unloading Voice Tapes........ 7.2.6
Usage of Memory........ 16.1

USE XON/XOFF Soft Key
- Computer Terminal........ 12.7.5
- Modem........ 10.4.6
- RS232 Serial Port........ 12.7.5
- Text Communication........ 10.4.6

User Maintenance........ 1.8
Using a Headset........ 4.8
Using Previously Formatted Tape........ 7.3.6
Using the RS232 Serial Port........ 12.2
Viewing Text in Display Memory........ 10.2.2
Viewing the Directory........ 5.2

Voice Message
- Automatic Answer With........ 9.4
- Automatically Sending From Formatted Tape........ 8.3
- Creating a New Automatic Sending........ 8.8
- Playing Over the Phone Line........ 7.3.10
- Recording on Formatted Tape........ 7.3.2

Voice Tape Recorder........ 7.2
- Controls........ 7.2.1
- Dictation Recording........ 7.2.3
- Playing Tape Recordings........ 7.2.5

Voice Tapes
- Loading........ 7.2.2
- Unloading........ 7.2.6

Volume Control........ 1.9.5
XON/XOFF Soft Key........(See USE XON/XOFF Soft Key)
Your Phone Number, Entering for Automatic Answer........ 9.3.1